THE MEDICAL JOURNAL OF AUSTRALIA

VOL. II.—21ST YEAR. SYDNEY, SATURDAY, NOVEMBER 17, 1934. No. 20.

Table of Contents

[The Whole of the Literary Matter in THE MEDICAL JOURNAL OF AUSTRALIA is Copyright.]

ORIGINAL ARTICLES— PAGE.

"Spinal Anæsthesia", by GILBERT BROWN, M.B., Ch.B. .. 629

"Some Problems in Urology", by JULIAN SMITH, M.D., M.S., B.Sc. .. 634

"Further Observations on the Allantoic Membrane of the Embryo Chick and its X Ray Reactions", by WARNFORD MOPPETT, M.D., Ch.M. .. 640

REPORTS OF CASES—

"A Case of Huntington's Chorea", by S. J. CANTOR, M.B., B.S. .. 650

REVIEWS—

Otitis and Mastoiditis .. 650

Alcohol .. 650

LEADING ARTICLES—

Bibliographic References .. 651

CURRENT COMMENT—

The Influence of Nutrition upon Resistance to Infection .. 652

ABSTRACTS FROM CURRENT MEDICAL LITERATURE—

Morbid Anatomy .. 654

Morphology .. 655

BRITISH MEDICAL ASSOCIATION NEWS— PAGE.

Scientific .. 656

CORRESPONDENCE—

Local Anæsthesia: "Sodium Amytal" and Morphine 662

The Use of "Evipan" in Dementia Præcox .. 663

UNIVERSITY INTELLIGENCE—

The University of Sydney .. 663

PROCEEDINGS OF THE AUSTRALIAN MEDICAL BOARDS—

Queensland .. 663

Tasmania .. 663

OBITUARY—

Lionel John Hood .. 663

John Henry Semple .. 663

Harold Thornton Bourne .. 663

BOOKS RECEIVED .. 664

DIARY FOR THE MONTH .. 664

MEDICAL APPOINTMENTS .. 664

MEDICAL APPOINTMENTS VACANT, ETC. .. 664

MEDICAL APPOINTMENTS: IMPORTANT NOTICE 664

EDITORIAL NOTICES .. 664

SPINAL ANÆSTHESIA.[1]

By GILBERT BROWN, M.B., Ch.B. (Liverpool),
Adelaide.

THE use of spinal anæsthesia has increased greatly during the last few years after a period in which it was viewed with grave suspicion. In its earlier days it was looked upon as a proceeding to be used only as a last resort in certain patients who were considered unfit for an inhalation anæsthesia. Its use was followed by a great fall of blood pressure and deaths were not uncommon. The introduction of new drugs and of better technique has overcome most of the difficulties, and spinal anæsthesia is now considered by some observers to be the method of choice for many operations on the abdomen and lower extremities.

[1] Read at a meeting of the South Australian Branch of the British Medical Association on July 26, 1934.

History.

A short *résumé* of the history of spinal anæsthesia will assist in showing the gradual development of this method and the reasons for the changes in technique. It may be divided into four periods, the first of which was preceded by four important researches.

In 1859 cocaine, the alkaloid of coca leaves, was discovered by Niemann, and three years later Schraff demonstrated its analgesic properties. In 1888 Corning[(1)] investigated the effect of the injection of cocaine in the immediate neighbourhood of the spinal cord. In 1891 Quincke[(2)] found that it was possible to remove cerebro-spinal fluid by lumbar puncture without danger to the subject.

First Period.

The above knowledge was used by Bier, of Kiel,[(3)] in his experiments, and in 1899 he tried the effect of the injection of 2·0 cubic centimetres of a 1%

solution of cocaine into his own spinal canal. It was then tried on his assistants and six patients. He used it extensively in his surgical work and was quickly followed by others, among whom were Tuffier,[4] Tait and Caglieri.[5] Before long a number of deaths occurred. Bier[6] protested against its reckless use and discarded the method until a safer drug should be found. Although it was still used by Tuffier and in a few Continental clinics, it was almost universally condemned. It was not used in England, and Probyn Williams[7] wrote in 1901: "No record of the use of this method in this country has as yet been published."

Second Period.

During the next three years "Stovaine", tropacocaine and "Novocain" were introduced and were applied to spinal anæsthesia. The results were rather better than with cocaine, and a revival of the method took place. In 1906 it was used extensively in England by Barker,[8] who employed a solution of "Stovaine" to which glucose was added in order to make it heavier than cerebro-spinal fluid. But the method was still looked upon with suspicion and was not generaly adopted. Between 1908 and 1910 it was employed by Jonnesco,[9] who added strychnine to his "Stovaine" solution and claimed that by his technique it was possible to eliminate respiratory failure. He applied his method to other parts of the body than the abdomen and legs, and in 1910 stated:[10] "I have generalised spinal anæsthesia, adapting it to all operations on any part of the body." But in the hands of others there were still deaths, respiratory failure was not uncommon, and great falls of blood pressure were frequent; therefore the method was avoided by the majority of surgeons.

Third Period.

The introduction of ephedrin in 1928 marked a great step towards safer spinal anæsthesia. In 1928 Wehrbein[11] advocated the use of ephedrin as a preventive of circulatory depression when injected hypodermically before spinal puncture. About the same time a new technique was introduced by Pitkin,[12] who used a solution of "Novocain" and strychnine in a special solvent consisting of alcohol and sterile water, with the addition of an amyloprolamine combination. He claimed that this solution, which he called "Spinocain", made it possible to control the limits of anæsthesia, the duration of anæsthesia and the fall of blood pressure. Pitkin's claims for "absolute controllability" have not been fully sustained;[13] in fact, one observer states[14] that "'Spinocain' is definitely dangerous". Pitkin's work has, however, contributed greatly to the advancement of spinal anæsthesia, as he insisted upon the routine administration of ephedrin before spinal puncture and showed the advantages of using a small needle with a short bevelled point.

Fourth Period.

The discovery of "Percaine" by Charles Miescher and its use by Uhlmann[15] marks a great advance in the search for a drug which provides a longer period of analgesia combined with lesser toxicity. It does not belong to the same family as cocaine and "Novocain", but is a derivative of quinoline and therefore related to quinine. It is ten times stronger than cocaine and twenty times stronger than "Novocain", and therefore far more toxic than either; but, as toxicity is in a great measure dependent upon concentration, and "Percaine" is effective in extreme dilution, toxicity is reduced to such a level that adverse symptoms are not produced. Even in this high dilution it is claimed that the local analgesia obtained exceeds in duration that hitherto obtained by any previously known drug. Howard Jones[16] has introduced a new technique with a solution of 1 in 1,500 "Percaine" in 0·5% solution of sodium chloride. This has a specific gravity of 1·00345 and so is definitely hypobarbic, as cerebro-spinal fluid has a specific gravity of 1·005. He advocates the treatment of the subarachnoid space in the same manner as that used in infiltration of the tissues, by the forcible injection of a large quantity of analgesic solution to the limits required by the operation. No cerebro-spinal fluid is withdrawn and the extent of the analgesia is controlled by the amount of fluid injected.

A further factor in lessening the danger of spinal anæsthesia was the discovery that the barbiturates are protective against the toxic action of most of the drugs used for local and spinal anæsthesia. Lovenhart and his associates[17] have shown that nearly four times the fatal dose of cocaine may be tolerated by animals which have been protected by fifty milligrammes of "Sodium amytal" (sodium iso-amyl-ethyl barbiturate) per kilogram of body weight. In the event of a convulsive seizure from a toxic dose of any of these local anæsthetics, "Sodium amytal" administered intravenously controls the convulsions almost immediately. This protective action of the barbiturates is most important, as Howard Jones[16] has shown that many of the deaths and untoward occurrences in spinal anæsthesia are due to the direct absorption of the anæsthetic drug through the blood stream.

Personal Experiences with Spinal Anæsthesia.

I began to use spinal anæsthesia in 1923, using the heavy solution of "Stovaine Billon" and occasionally a locally prepared solution of "Stovaine" and glucose. The first of these anæsthetics was administered to a patient of Sir Henry Newland (then Dr. Newland), who had introduced spinal anæsthesia into South Australia twenty-one years previously. The results were satisfactory from the point of view of anæsthesia, but occasionally rather worrying from the extreme fall of blood pressure. This is well shown in the following case:[18]

CASE I. Blood pressure chart 614 of June 2, 1927.—John S., aged sixty-nine years, was suffering from a urethral stricture and perineal fistula. He was given a spinal injection of 1·5 cubic centimetres of "Stovaine Billon" and satisfactory analgesia was present in five minutes. Dr. Newland excised the stricture by Hamilton Russell's method. Before operation the systolic blood

pressure was 140 millimetres of mercury and the diastolic pressure 98 millimetres. Either the dose of "Stovaine" was too large or the patient was moved too soon, but the result was rather terrifying. The blood pressure fell rapidly to 40 millimetres systolic and 25 diastolic; the patient's colour became grey, he sweated, had air hunger and was only partly conscious. Restoratives were given and by the end of the operation the blood pressure had risen to 60 millimetres systolic and 40 diastolic. The patient was hurried back to bed, the "shock cradle" was applied, a rectal injection of saline solution was given, and the foot of the bed was raised. An hour later his condition had improved and he made a good recovery. He was, however, troubled with a very severe headache for several days and suffered from pains in his legs for some weeks.

One or two cases of this kind damped my ardour for spinal anæsthesia, and I seldom used it until the introduction of ephedrin. In 1930 I again used "Stovaine Billon" in smaller doses and with a hypodermic injection of ephedrin immediately the spinal tap had been made. The results were much better, but the analgesia was sometimes too short, and supplementary general anæsthesia had to be used, as is shown in the following case:

CASE II. Record 739 of November 3, 1930.—Mr. S., aged fifty-nine years, was suffering from a carcinoma of the rectum. Spinal anæsthesia was induced with 1·2 cubic centimetres of "Stovaine Billon" and 0·049 gramme (three-quarters of a grain) of ephedrin was given hypodermically. Sir Henry Newland excised the rectum. After the operation had been in progress for fifty-five minutes there was some return of sensation, and nitrous oxide and oxygen had to be administered for the remaining forty minutes.

In 1931 I used "Novocain" by Pannett's method[19] with fairly satisfactory results, although the analgesia was sometimes too short in upper abdominal operations, as is shown in the following case:

CASE III. Record 187 of March 13, 1931.—Mrs. B.H., aged fifty-eight years, was suffering from gall-stones. She was given a spinal injection of 1·0 cubic centimetre of a 15% solution of "Novocain". Thirteen minutes later Sir Henry Newland began the operation for cholecystectomy. Analgesia became defective in the upper part of the wound and ethylene and oxygen were required in order to complete the operation.

Later in 1931 I began to use "Spinocain" by Pitkin's technique and the results were much improved. The fall of blood pressure was less and the analgesia was greater. However, now and then cases occurred in which there was little analgesia, although the muscles were well relaxed, as is shown in the following case:

CASE IV. Record 783 of October 30, 1931.—Mrs. J., aged forty-five years, was suffering from gall-stones. She was given a spinal injection of "Spinocain" and Sir Henry Newland removed her gall-bladder. Pain was felt when the fascia was opened and ethylene and oxygen were required before the operation could be continued. The recti were absolutely relaxed and the abdomen was quite soft.

It seemed obvious that the solution of "Spinocain", which is hypobarbic (lighter than cerebro-spinal fluid) had risen and soaked the anterior spinal nerve roots and only partly affected the posterior roots. Other observers had also noticed this defect and suggested that the patient should first be placed in the ventral decubitus for five minutes so that the solution would float upwards to soak the posterior roots and so provide ample analgesia. Although "Spinocain" was usually satisfactory, it did not prove in my hands the "absolutely controllable" agent as described by Pitkin.

In 1932 I began to use "Percaine" by the Howard Jones technique, and this has proved more satisfactory than anything else that I have tried. With its use the patient appears to be in better condition, analgesia may be prolonged to two hours or more, and the relaxation is excellent.

Equipment.

The following equipment is necessary for the use of spinal anæsthesia.

1. A "Record" syringe of 20 cubic centimetres capacity.

2. A spinal needle of rustless steel or nickel, of 20 to 22 gauge, with the point bevelled at 45°. Such a needle will bend and not break, as may happen with the ordinary steel needle. It is inadvisable to use the large Bier needle of 15 to 17 gauge, as trauma is increased and leakage of cerebro-spinal fluid is more likely to occur. Needles with a long tapered point should be avoided, as only part of the point may be inside the theca, the anæsthetic solution thus being allowed to be injected outside and resulting in faulty anæsthesia. I usually use a Pitkin needle fitted to a "Record" mount.

3. A fine needle for infiltrating the skin and ligaments.

4. A fine tenotome to incise the skin. This obviates the use of force and allows the spinal needle to move more easily.

5. An ampoule of 20 cubic centimetres of "Percaine" solution of 1 in 1,500 strength.

6. A hypodermic syringe containing 0·097 gramme (one and a half grains) of ephedrin.

These instruments may be sterilized by boiling in water, which must not contain any soda, as the "Percaine" solution is slightly acid. Or the instruments may be placed in alcohol overnight and washed with sterile water before use.

Technique.

To obtain the best results with spinal anæsthesia it is essential to carry out a very careful technique; the small details may make the difference between success and a failure that may be serious to the patient or that may necessitate the addition of general anæsthesia. Premedication should be adequate, but not excessive; personally I prefer to use "Nembutal" in doses of 0·097 to 0·292 gramme (one and a half to four and a half grains) rather than morphine, as, in addition to its sedative effect, it has a protective action against most of the local anæsthetic drugs. It has been shown by Purves-Stewart and Willcox[20] that the barbiturates after administration are found in appreciable quantities in the cerebro-spinal fluid.

The operating table should be well padded and every endeavour should be made to increase the

comfort of the conscious patient. Talking and noise should be reduced to a minimum; it is well for the assistant to remember that the upper part of the body is not analgesic and that it should not be used as a place on which to put instruments or as a rest for his arm. The patient's back should be prepared in the same manner as the operation area; it is better to avoid iodine, lest some be carried in with the needle. An injection of 0·097 gramme (one and a half grains) of ephedrin is given fifteen minutes before the spinal puncture. The blood pressure apparatus is fixed to the patient's arm so that readings may be taken at intervals throughout the operation. When all the apparatus is ready and the syringes are filled, the patient is turned on to his left side and the skin is again cleaned with ether. The back should be flexed as much as possible and steadied by a nurse with one hand on the back of the neck and the other in the crook of the knees. The towels are so arranged that one is across the back, with its edge level with the highest part of the iliac crest; this crosses the spine at the level of the fourth lumbar spine. The vertebræ are palpated to determine whether the second or third space is the larger and so the easier one for the lumbar puncture. A skin wheal is made over this space with some of the "Percaine" solution; the needle is then passed through the wheal for about 2·5 centimetres (one inch) and 1·0 cubic centimetre more is injected into the ligaments. A small stab wound is then made through the centre of the wheal with the tenotome. The spinal needle is passed through this puncture, in a direction at right angles to the skin, until it is felt to pierce the dura. Only enough cerebro-spinal fluid is allowed to escape to verify the accuracy of the puncture, the syringe is then attached and the requisite amount of "Percaine" solution is injected slowly. At times some resistance will be felt after a few cubic centimetres have been given, and a pause after the injection of every two cubic centimetres will allow time for the fluid to force its way upwards. The needle is then withdrawn and the puncture is sealed with collodion. The patient is then turned on to his face and left in that position for five or six minutes in order to soak the posterior nerve roots. The duration of the subsequent analgesia is determined largely by the time during which this position is retained, but the fall of blood pressure is greater when this time exceeds five minutes. The patient is then turned on his back and the table is placed in the Trendelenburg position at an angle of 20° to 30°. An anæsthetic screen or a towel placed over the eyes will prevent the patient watching the operation. By the time that the skin is prepared and the towels are draped relaxation and analgesia will be present. This may be tested by asking the patient to lift his leg and to cough; he may just be able to move his foot, but unable to raise his leg; he will find some difficulty in coughing effectively, as the lower part of the abdominal muscles will be relaxed.

Except in case of emergency, it is unwise for the surgeon to administer the spinal injection, as the patient requires to be watched carefully throughout the operation, so that any untoward symptoms may be detected immediately and treated. The position may become irksome to the patient during a long operation and some further sedative may be required; an injection of morphine will usually suffice. Severe circulatory depression may be treated by increasing the tilt of the table, giving inhalations of "Carbogen", or injecting four minims of adrenaline. After the blood pressure has fallen there appears to be little response from ephedrin, pituitary extract or "Coramine". In extreme circulatory depression an intravenous infusion of a litre of normal saline solution should be given. This solution should contain 4% of glucose and four minims of 1 in 1,000 adrenaline solution.[21] Nausea and vomiting may occur when there is traction on the mesentery, stomach or gall-bladder; this may often be relieved by inhalation of "Carbogen". To increase the comfort of the patient it may be necessary to sponge the face, give sips of water or brandy, or alter the height of the pillow.

Dosage of the "Percaine" Solution.

Howard Jones regulates the dose of "Percaine" according to the formula:

P = D – 6 (for women)
P = D – 4 (for men)

where P is the amount of the "Percaine" solution in cubic centimetres and D is the distance in inches between the seventh cervical vertebra and the intercristal line.

In practice it will be found that for the man of average size six cubic centimetres will produce caudal block; nine cubic centimetres are enough for an amputation through the thigh; eleven or twelve cubic centimetres will suffice for a subumbilical operation, such as prostatectomy, herniotomy or appendicectomy; thirteen to fifteen cubic centimetres will be required for upper abdominal operations. In the case of women one or two cubic centimetres may be deducted from these amounts.

After-Treatment.

The patient should be returned from the operating theatre to his bed in the "head low" position (at the Adelaide Hospital there is a special trolly with a tilting top). The foot of the bed should be raised on blocks for six hours and for a further two hours the patient should remain flat, with only one pillow. Nurses should be warned of the danger of burning the legs with hot water bottles, as sensation may not be entirely regained for four hours. Drinks and food may be given immediately after return to bed, if desired. Attention must be paid to the bladder, as occasionally there is retention of urine. Headache occurs in a small percentage of patients, but it has been definitely less frequent since small needles have been used for lumbar puncture. It may be relieved by aspirin or, in severe cases, by a rectal injection of 180 cubic centimetres (six ounces) of a 50% solution of magnesium sulphate. Hiccup is usually controlled by inhalation of "Carbogen".

Analysis of Results.

In the time at my disposal in compiling this paper it has been possible to survey only the last fifty cases of spinal anæsthesia with "Percaine".

Sex.—There were thirty-eight male and twelve female patients.

Age.—The youngest patient was twenty-one years and the oldest seventy-seven years; the average was 55·92 years.

Diseases Complicating the Operative Condition.—There were numerous patients suffering from slight impairment of renal function and several suffering from minor degrees of cardiac disease. Among the more serious conditions were diabetes in four patients, pulmonary tuberculosis in three, and *angina pectoris* in one.

Premedication.—The barbiturates were used as premedication in thirty-four patients, morphine in fourteen, and no premedication in two.

Operations.—The operations performed were as follows:

Prostatectomy (including diathermy 2, punch 1)	19
Bladder and male genitalia	5
Amputations, and semilunar cartilage 2	8
Herniæ	5
Excision of rectum	3
Partial colectomy	2
Abdominal sympathectomy	2
Intestinal obstruction	2
Gastrostomy	1
Cholecystectomy	1
Colostomy	1
Laparotomy	1
Total	50

Effect on Blood Pressure.—The blood pressure was raised in five cases (average rise 13·6%). It was unchanged in one and lowered in forty-five cases. The smallest fall was 6·7%, the greatest fall 60·8%, and the average fall 18·2%.

Post-Operative Complications.—There were no very serious post-operative complications. Slight bronchitis occurred in one patient. Hiccup occurred in two patients, in one of whom it lasted for twenty-four hours and in the other was present off and on for eight days; in each case it was relieved by "Carbogen". Vomiting was present to a slight extent in a number of patients, especially in those submitted to prostatectomy, when the renal function was poor. In one patient it was severe; this was the one in whom hiccup lasted for eight days. Headache was severe in one patient only.

Supplementary General Anæsthesia.—Supplementary general anæsthesia was used in three patients. In two of these nitrous oxide and oxygen were used as combined anæsthetic agents for excision of the rectum. To the other patient ethylene and oxygen were administered on account of restlessness. The analgesia was, however, adequate in all cases.

Advantages of Spinal Anæsthesia.

The advantages of spinal anæsthesia are as follows:

1. Muscular relaxation is better than is obtainable with any other form of anæsthesia.
2. The respiratory excursion is slight.
3. Carbohydrate metabolism is unaltered, so that diabetic patients may be operated upon without previous preparation with insulin or danger of acidosis.
4. Shock from trauma is lessened, as the operation area is physiologically severed from the brain.
5. Vomiting is rare, except in upper abdominal operations.
6. The patient is conscious and may be fed immediately after operation or even during its progress.
7. Post-operative "gas pains" are prevented, as peristalsis is not interfered with.
8. Secretion of urine begins much earlier after prostatectomy than when general anæsthesia is employed.

Disadvantages of Spinal Anæsthesia.

The following are the disadvantages of spinal anæsthesia:

1. The patient is conscious, so that the method may be unsuitable for highly nervous patients.
2. The blood pressure may fall considerably and so render it unsuitable for certain patients.
3. Reactionary hæmorrhage may follow the post-anæsthetic return to normal blood pressure.
4. Respiratory complications are slightly more frequent than with inhalation anæsthesia,[23][24] although their severity is less.
5. Respiratory failure may occur if the anæsthesia is too high.
6. Severe headache, hiccup and paralyses are occasional complications.
7. There is a failure to obtain anæsthesia in a small percentage of patients. This may be due to faulty technique or to insusceptibility of the patient to the drug.

Indications for Spinal Anæsthesia.

The following are the indications for spinal anæsthesia:

1. Operations on the lower extremity, perineum and lower part of the abdomen.
2. When pulmonary disease is present and the gaseous anæsthetics are unobtainable or inapplicable.
3. In patients suffering from diabetes.
4. In intestinal obstruction. Here it is most valuable on account of the perfect relaxation of the abdominal wall, combined with active contraction of the intestinal muscle.
5. In recurrent and incisional herniæ, on account of the good muscular relaxation and the probable absence of post-operative vomiting.
6. In prostatectomy, especially in the open operation, where good relaxation is essential for suturing inside the bladder.
7. As an adjunct to the gaseous anæsthetics in excision of the rectum and in certain operations in the upper part of the abdomen which require complete relaxation for a considerable time.

Contraindications to Spinal Anæsthesia.

Contraindications to spinal anæsthesia may be enumerated as follows:

1. Surgical shock, hæmorrhage and abnormally low blood pressure. Spinal anæsthesia is contraindicated since it tends to depress further an already lowered blood pressure.
2. Septicæmia.
3. Sepsis in the region of the proposed lumbar puncture.
4. Diseases of the central nervous system, in which is included syphilis.
5. Turbidity of the cerebro-spinal fluid.
6. Moribund patients.
7. Patients who have a very small pulse pressure, as in certain cardiac conditions. The systolic pressure usually falls more than the diastolic.
8. A high block is contraindicated in patients suffering from pulmonary disease who have had a phrenic avulsion or thoracoplasty performed, or whose respiration is impeded.[24]
9. Cases of very high blood pressure, unless carefully watched and tended, as in these patients is seen the greatest fall of blood pressure under spinal anæsthesia.

Conclusions.

1. Spinal anæsthesia is useful for certain operations on the lower extremities and lower part of the abdomen.
2. It has advantages in certain operations in the upper part of the abdomen, but the margin of safety is decreased.
3. The details of the technique must be carried out most scrupulously to obtain satisfactory results.
4. Except in cases of emergency, the surgeon should not administer spinal anæsthesia himself, as it is impossible while performing the operation to keep a satisfactory watch on the patient's condition.

References.

(1) J. L. Corning: "Spinal Anæsthesia and Local Medication of the Cord", *New York Medical Journal*, Volume XLII, October 31, 1885, page 483.
(2) H. Quincke: *"Die Lumbalpunktur des Hydrocephalis"*, *Berliner Klinische Wochenschrift*, Volume XXVIII, 1891, pages 929, 965.
(3) Bier: *"Versuche über Cocainisierung des Rückenmarkes"*, *Deutsche Zeitschrift für Chirurgie*, 1899, page 361.
(4) T. Tuffier: *"Analgesie chirurgicale par l'injection sous-arachnoidienne lombaire de cocaine"*, *La Presse Médicale*, November 15, 1899, page 294.
(5) Tait and Caglieri: "Experimental and Clinical Notes on the Subarachnoid Space", *The Journal of the American Medical Association*, July 7, 1900.
(6) Bier: *"Bemerkungen zur Cocainisierung des Rückenmarkes"*, *Münchener Medizinische Wochenschrift*, September 4, 1900, page 1226.
(7) R. J. Probyn-Williams: "A Practical Guide to the Administration of Anæsthetics", 1901, page 200.
(8) A. E. Barker: "A Report on Clinical Experiences with Spinal Analgesia", *The British Medical Journal*, March 23, 1907, page 665.
(9) T. Jonnesco: "Remarks on General Spinal Analgesia", *The British Medical Journal*, November 13, 1909, page 1396.
(10) T. Jonnesco: *American Journal of Surgery*, Volume XXIX, 1910, page 33.
(11) H. L. Wehrbein: "Ephedrin in Spinal Anæsthesia", *The British Journal of Anæsthesia*, Number 4, April, 1928, page 178.
(12) G. P. Pitkin: "Spinocain: The Controllable Spinal Anæsthetic", *The British Medical Journal*, August 3, 1929, page 183.
(13) C. Donald: "Spinal Analgesia with Spinocain", *Proceedings of the Royal Society of Medicine*, Volume XXIII, 1930, page 915.
(14) J. M. Buchanan: "Gynæcological Anæsthesia", *The Australian and New Zealand Journal of Surgery*, Volume III, January, 1934, page 248.
(15) F. Uhlmann: "Concerning Percaine, A New Local Anæsthetic", *Narkose und Anæsthesie*, Volume VI, June 15, 1929, page 168.
(16) W. Howard Jones: "Spinal Analgesia: A New Method and a New Drug, Percaine", *British Journal of Anæsthesia*, Volume VII, April, 1930, page 99, and Volume VII, July, 1930, page 146.
(17) P. K. Knoefel, R. P. Herwick and A. S. Loevenhart: "Prevention of Acute Intoxication from Certain Local Anesthetics", *Journal of Pharmacy and Experimental Therapy*, Volume XXIII, 1928, page 256.
(18) Gilbert Brown: "The Choice of the Anæsthetic", THE MEDICAL JOURNAL OF AUSTRALIA, August 18, 1928, page 202.
(19) C. A. Pannett: "A Note on Spinal Anæsthesia", *The Lancet*, June 8, 1929, page 1194.
(20) J. Purves-Stewart and W. Willcox: "Poisoning by Barbitone and Allied Drugs", *The Lancet*, January 6, 1934, page 6.
(21) The Anæsthetic Staff of the Alfred Hospital, Melbourne: "Practical Anæsthesia", page 164.
(22) L. F. Sise: "Postoperative Pulmonary Complications, with Special Reference to the Effect of Spinal Anesthesia", *Anesthesia and Analgesia*, Volume XI, January-February, 1932, page 23.
(23) D. S. King: "Postoperative Pulmonary Complications: The Part Played by Anesthesia, as shown by a Two Years' Study at the Massachusetts General Hospital", *Anesthesia and Analgesia*, Volume XII, November-December, 1933, page 243.
(24) C. Langton Hewer: "Recent Advances in Anæsthesia and Analgesia", 1932, page 117.

SOME PROBLEMS IN UROLOGY.[1]

By JULIAN SMITH, M.D., M.S., B.Sc. (Adelaide),
Honorary Consulting Surgeon, Saint Vincent's Hospital, Melbourne.

I REGARD this meeting as a very important one, because it inaugurates the section dealing with urology. It is important because the percentage of such cases in our work is quite high; it is important because problems affording profitable discussion are plentiful and cure is frequent; and it is important because there is a need for those specially informed in urology to impress upon the profession as a whole the full requirements of such work in investigation and in treatment. Now it may seem a platitude to say that such cases need zealous and orderly investigation, but my experience makes me say it. I have, for instance, frequently seen diagnosis and treatment in women based on the study of non-catheter specimens of urine; or again, the microscopic study of the urine omitted when it is essential; and often cases of hæmaturia are allowed to go uninvestigated because of a long and symptomless interval. Some of these have later proved serious and the delay fatal. No more responsible case comes under our care than that of an unexplained hæmaturia; there should be a determined and repeated attention given until the diagnosis becomes clear. Again, it has been my experience more than once to see a patient, fairly recently operated upon for vaginal repair as a remedy for cystitis, only to discover at my examination a thickened lower ureter and the usual cystoscopic and microscopic evidences of urinary tuberculosis. I could recount very many more similar situations showing slipshod work; but nearly always they have been instances of not looking rather than of not knowing. Where there is lack of time or special ability on the part of the

[1] Read at a meeting of the Victorian Branch of the British Medical Association on June 6, 1934.

medical attendant the sending of such patients promptly to the proper quarter for investigation cannot be too strongly urged.

Now how much should the medical practitioner, in his toilsome, busy day, personally undertake in the way of investigation? Should he use the microscope and centrifuge as a routine and even stain deposits, if present? A good deal can be said for such a practice. Properly organized, it takes very little time, and I think it gives one a far better mental picture of a case; one forms a truer appreciation of the significance of pus, red cells, crystals, casts, bacilli and so on than from a written report. With increasing experience comes the ability to sift the trivial from the serious, the local from the general. Moreover, this portal of inquiry employed as a routine occasionally throws a flood of light on some or other case of vague general ill-health.

Now when I somewhat diffidently promised your President to give this address, I had the idea of making it an account of some of my experiences in urology. I had in fact covered much paper in relating cases of interest bearing on hæmaturia of very diverse origins, each one pointing a moral, but there threatened to be too much moralizing. I intended also to show how many subjects were fit for profitable discussion at this section's meetings. How, for instance, frequency of micturition, in its many anomalous forms, would lend itself to debate. And again, the various aspects in prognosis and treatment of villous tumour and to recount one patient of mine, whose condition was of twenty years' duration, still alive and well, but still requiring fulguration occasionally. How carcinoma of the bladder could be best approached; to discuss its prognosis; and how amongst many successes I had also seen late recurrences, one being after eleven years and showing precisely the same type of malignant tumour and the same site; and again, to touch upon the entrancing subject of hydronephrosis, including its simulation of other things in the hands of the unwary; how I had met and managed bilateral cases; and a case with gastroenterostomy performed as a mistaken remedy. I followed this then by interesting experiences with cystic kidney disease, one case being unilateral and full of adventures; and again, the whole lifelong experience with calculus cases loomed large, and just as large the complex problems of urinary infections. I realized, however, that such a venture was far beyond the scope of an evening; so, in looking for a sign, as it were, I asked in passing a very eminent colleague one day what he considered the most pressing question in urology. He answered: "Well, I suppose the prostate." I said: "Why?" He said: "Well, prostatectomy does seem to me such a murderous proceeding." And, indeed, one must admit that from the viewpoint of some unedited public hospital statistics the epithet is well deserved; but I submit that an operation which should nowadays have a mortality rate under, say, 5% to 6%, and which, moreover, nearly always cures what would otherwise prove fatal, deserves a better name.

Now, by introducing one more talk to the long list already made about this evergreen subject, I am tempted to be reminiscent. The period extending from my early student days until the present covers the whole development of prostatectomy. It fell to my lot as a second year student in Adelaide to be surgical dresser to several cases of complete prostatic obstruction. Some patients were admitted to hospital seriously ill and it become one's job, by daily irrigations, to clean up their bladders. Some of them remained in hospital for so long as three months. Some recovered clean tongues and a good colour and thus were schooled into a catheter life. Others died, and one saw the *post mortem* examinations by Professor Watson. I remember asking him whether nothing more could be done for this disease, and he took me along to his pathological museum and showed me a specimen of mandarin size and shape and read to me the inscription on the jar: "Supposed prostatic tumour—recovery." The facts were that the bladder had been opened to relieve cystitis with calculus in an old man; an enormous prostate presented and was regarded by the surgeon as a tumour. It was seized with volsellum and partly liberated by scissors and stripping, when suddenly it came away as a single rounded mass. From the notes it appeared that the patient recovered and passed urine normally thereafter. This had occurred in 1886 and is an instance of failure to recognize a discovery. For though Watson saw the significance of the incident, he could not persuade the surgeons in Adelaide to follow it up. My surgical teachers of that period had accepted the dictum of the then two leaders in thought, Sir Henry Thompson and Guyon, namely, that a bladder distended for months by prostatic obstruction could never regain its tone. So fixed in his belief was Thompson that in 1887 he introduced a new method of treatment in cases in which catheter life had broken down. This was permanent suprapubic drainage. He showed a patient before the London Clinical Society under that treatment for one and a half years and thereby restored to excellent health. It is surprising to us now that Thompson did not realize that the bladder does regain tone. Very little testing will disclose the fact in any case now so drained.

Evidently McGill realized this, however, for it is a dramatically interesting piece of history that he, at the same meeting, reported three cases in which he had removed by suprapubic operations the obstructing portions of the glands and restored normal urination. It is a fact that McGill thought that the obstructing portion of the gland was entirely intravesical, and his written description shows that he had a pretty tough time operating in some of the cases, succeeding only by a piecemeal method. Moreover, he reserved his operation for late cases showing failure of catheter life. Further trial showed 30% of failures in the McGill operation and the atony theory was revived; but Belfield, of Chicago, who slightly antedated McGill with a partial prostatectomy, denied this and stated

that the failures were due to the obstruction by the periurethral portion of the gland and advised an additional incision in the perineum for removal of these obstructing nodules. At this time also Morris was attempting perineal removal in London, but McGill could not acquiesce; nevertheless we find Zuckerkaadl, of Vienna, reporting successful perineal prostatectomy in 1889. Thus it is clear that at this period surgeons in all countries were hot upon the trail; but perfection was not yet in sight. And now we come to one of the most amazing incidents in the history of surgery. White, of Philadelphia, in 1893 gave an able address summarizing prostatectomy as it then stood, and in realizing its defects, suggested an analogy between *myoma uteri* and prostatic enlargement, and tentatively suggested that castration might bring about prostatic atrophy. Though considering it as a possibility, he did not seriously recommend it. Despite his moderation, the suggestion ran like wildfire through the surgical world, and I can recall the fact of its arrival in Adelaide and the very unsatisfactory results that followed its application. Speaking again in 1904 and in retrospect, White said: "Doubtless most surgeons dismiss castration and vasectomy as useless. It may be that they are entirely right."

During this period of indirect operations for the relief of prostatic disease, very little advance was made with the technique of prostatectomy. One fact of importance emerges. Fuller strongly opposed the apparently general disfavour of direct surgery on the prostate. He said the idea was all right, but that the operation would not succeed unless the periurethral portions were removed. And as the suprapubic route with partial removal of the gland was followed by so many failures, attention for a time turned to the perineal route. Thus at the beginning of this century we find the French perfecting retractors to bring the prostate well within operative reach, thereby placing the perineal route in a practical position. Young, in America, took this up and brilliantly popularized it, so that today perineal prostatectomy retains a permanent place in American surgery.

Fryer and his work now enter the picture. It is clear from his writings that he favoured McGill's suprapubic method, despite its shortcomings. Reading between the lines, I suspect that he was extremely dexterous and ingenious, and that he used his fingers as accessories to snipping portions of the prostate free in the partial prostatectomy. At any rate he describes how, when examining one specimen after removal, he found that he had removed the whole gland in one piece. The patient did splendidly and Fryer had the genius to see that he had made a discovery of great moment. In his earlier reports he describes the preservation of the whole prostatic urethra, but he soon corrected this, as he realized that it was frequently torn across and partly removed in nearly all cases. Fryer had plenty of work, and in 1908 he described his first 481 cases with 32 deaths—an amazing achievement. He, of course, excludes the malignant cases from this series. He appears to have made very little fuss about hæmorrhage. Why were Fryer's figures so good? He says that the greater number of these 500 patients had led a catheter life for periods of nine months up to twenty years. Thus they were a sample which had become immunized against sepsis. It is clear that the weaklings had been culled by death. In the light of our present methods it is interesting to read what he wrote. He says:

> Patients should be confined to their room three or four days before operation, but not necessarily to bed. Before performing the operation the bladder is thoroughly washed out with antiseptic lotion, as in this disease the urine is almost invariably foul.

Of the 32 deaths in this 481, thirteen were from uræmia, six from heart failure, two from septicæmia, two from mania, two from shock, and one each from exhaustion, heat stroke, pneumonia, bronchitis, embolism. You will see that no mention is made of hæmorrhage, but who can doubt that anything more than moderate hæmorrhage in these cases at once diminishes the chances of recovery and renders fatal complications more likely. In fact, could we in prostatectomy at all times reduce the bleeding to that of a hernia operation, the mortality in operations done properly and done early should approach that of hernia in value.

Now, rapid as was the spread of White's operation, there was an even swifter abandonment of it when Fryer spoke. He gave to the world the essential idea in his total enucleation of the prostate. The majority of surgeons now adopt the suprapubic route, though a percentage in America adhere to the perineal approach. Lowsley, for instance, reported one series of 300 cases with mortality just below 6%. I saw him operate in two cases. He uses suprapubic drainage in the preparatory period. He uses combined sacral and parasacral local anæsthesia because he thinks that a general one tends to induce hæmorrhage and to damage renal tissue. The impression I formed when watching him was that the induction of anæsthesia consumed much valuable time and that the operation itself took much longer than a suprapubic operation. I suspect that the operation is easier than it looks, or he would abandon it. He says that the shock is negligible and the average postoperative stay in hospital is twenty-two days. I note that hæmorrhage as a complication occurred in 2% of cases. Taking Lowsley's mortality figures as a sample of the perineal operation, we find them no better than, say, those of Thomson Walker, a leading advocate of the suprapubic route.

Now, though statistics are very useful as an indication of progress in any matter, it may be said that perhaps too much notice is taken of the bare figures without all the requirements of true statistical research being satisfied. Thomson Walker's own figures, taken a year at a time, vary between 2% and 11%. One condition to be observed, therefore, in a scientific inquiry is obvious, namely, that when the mortality is low, the number of cases considered must be high; in fact, several

hundreds. Again, a low death rate may not indicate the safer route, but rather the skill of the surgeon, and it is at least possible that his figures might be better if he chose another type of operation. Then again, another factor influencing statistics is the age of the surgeon. When he is young he has less experience and is often too courageous; this stage is followed by that of highest efficiency, and that in its turn by the period of fame. And who, with diplomacy, is willing to put age limits to these, though it is from one or both of these that figures are usually drawn; for I suspect that the figures of youthful surgeons are incomplete or become lost. But another quite definite factor in the statistical inquiry is the type of hospital employed. Thomson Walker has shown, by using numbers running into thousands of cases, that a general hospital has by far the highest mortality in prostatectomy, the special hospital less, and his own private work much less still. He cleverly analyses the subfactors influencing these results, but his remarks come to this, that good results become a matter of technique and attention to detail; by that I mean of the whole management of the undertaking and not the operation alone.

Mr. Bernard Zwar, at the recent congress in Hobart, drew attention to the high mortality rate in prostatectomy in our public hospitals and launched a fervent appeal for earlier operation. He said that the practitioner and the public should be brought to see that urinary obstruction was just as serious and as urgent a condition as intestinal obstruction.

Personally I have very little confidence in the value of medical propaganda prepared for the general public. Something might be done perhaps by popularizing the fallacy of the belief that a failing stream and increasing frequency are "natural" to advancing years; but the real remedy is to be sought in the direction of reform in the management of the patients coming under treatment. If the general practitioner knows that a case of complete retention requires as careful an aseptic approach and non-hæmorrhagic management in fact as an abdominal operation, why does he persist in abortive attempts with metal catheters and land the patient at a public hospital with a bladder full of blood and pus, when he knows that soft catheters only are permissible, and that, failing these, any sterile puncture needle used suprapubically will temporarily relieve the situation? And if it is known that gradual decompression is vital, why is a drum-tight old bladder so often emptied in one flash and the patient sent on his hurried way to dry-tongued uræmia? If it is known that a non-septic state is so essential to a successful operation, why is an ill-tolerated, insufficiently attended inlying catheter persisted in because of a routine, when a suprapubic self-retaining one is easily introduced and sometimes more appropriate and useful to the nursing? And if it is known that results will be bad unless renal dysfunction is first relieved, why are patients operated on earlier than this, or even without biochemical tests at all, because of bed scarcity or of "operating day" convenience? And if it is known that some patients require permanent suprapubic drainage only, because more radical surgery would be fatal, why is prostatectomy performed at all? And if it is known that special wards, special nurses and, above all, special house surgeons, are the final and most important necessity, why are these patients so often left in draughty, shock-producing wards, with insufficient nurses to give the constant attention so necessary and with house surgeons overloaded with other duties preventing the close supervision so essential?

In short, if high mortality rates are preventible, why are they not prevented?

Prostatic obstruction is no minor ailment; it is very much a major disease. It must be approached with deliberation. At no stage must the fences be rushed. It may be that some public hospitals are short of accommodation and the constant cry for urgent admissions leads to unwise haste. But very little explanation to the authorities will smooth this out. Many years ago, when I took office on the indoor staff at the Saint Vincent's Hospital, I adopted this policy with highly satisfactory results. I made the stand because of my student day experience in these cases, and I refrained from operating until after a varying number of weeks the patient's tongue was clean, the appetite restored and the bladder reasonably clean. But nowadays we all know the biochemical tests which tell us when the patient has reached the operable stage brought about by one or other method of preparatory bladder drainage and renal easement. Personally I always look for excuses to prolong the waiting period. I like to see that characteristic improvement in general appearance and mental alertness become well established. As to the time required, the only rule applicable to this period is that there is no rule. I have waited a month not infrequently, and since a more frequent use of suprapubic drainage has come about I realize that some of these cases, so-called inoperable, become operable after some months of drainage. When poorish results from biochemical blood and urine tests persist, I like to appeal to the indigo-carmine inspection as a final touchstone. I look upon this as the least fallible of all, and if at the end of ten minutes from the time of injection the secretion is quite pale, further delay in operating is indicated.

Sepsis must be considered. How many of the patients in the period of preliminary decompression have sterile urine? I think there are very few, and in all some general effect is to be observed at some stage. Often it is not much; maybe some transient rise of temperature and impairment of appetite. I confess I feel safer with cases in which some degree of this has occurred. Recovery from it before operation gives that desirable immunity with resulting resistance to sepsis after the operation. I am always able to grow organisms from these urines, and in cases where some rise of temperature has

occurred, and even if not and at the same time renal efficiency is poor, it is my custom to help on immunization by the use of an autogenous vaccine before operation.

Now the mention of sepsis calls to mind the nursing factor, perhaps the most important of all. Of course, every nurse should be a specialist in what she is nursing. That is the ideal, but I think prostatectomy is preeminent in its needs of a nursing staff specially trained for the work. Time does not permit details tonight, but I have found my task very much easier and requiring fewer visits and less personal attention when I am assisted by nurses whom I have trained in all the requirements of these cases. The appreciation at all times of aseptic methods should be innate.

In the matter of anæsthesia, I have never used a local anæsthetic, but down through the years have employed spinal anæsthesia occasionally. For comfort of operating I have always found it ideal, yet have shrunk from continuing its routine use out of an objection to using anything potent and blood pressure lowering in the spinal canal that I cannot withdraw at will, especially in operations in which much hæmorrhage may occur. In my early days I saw much chloroform used. Bird always refused ether because of pulmonary considerations and hæmorrhage. Chloroform certainly gave splendid relaxation; I met with no calamity. By far the larger number of my long series of patients have had ether and, all considered, I incline to the intratracheal use of that method supplemented with oxygen. I think anæsthesia is one of the points on which the surgeon should be quite firm and insist on having an expert, well versed in the vagaries of prostatectomy. Statistics will be inglorious if this factor is neglected.

Now, as to the type of operation, I pass over the perineal route, not from disrespect, but just from inexperience of it, and turn to the suprapubic one.

First, as to the preparatory period of renal and cardiac uplift. I have used the inlying catheter quite a lot, but it has its disadvantages. Some urethræ definitely will not tolerate it. Long foreskins have often proved a disadvantage. Then there is the objection to a foreign body within an organ about to be removed, irritating it and keeping up its congestion and interfering with its drainage. Thus I have come more and more to the use of the suprapubic puncture and of a self-retaining number 11E rubber catheter, draining into a bottle at the bedside and used for frequent irrigations. It is introduced under local anæsthesia as close to the pubes as possible, the patient being in the Trendelenburg position. Later at the operation for the prostatectomy the bladder is filled and this tube is clamped and remains in position; the bladder is opened independently of this, as it occupies so little room quite close to the pubes and the amount of scar tissue from the opening is practically negligible. The catheter is finally liberated by extending the incision into its track, if convenient; otherwise it is just withdrawn and the track discarded. By this technique the difficulties with scar tissue usually complained of are entirely avoided. Naturally the tube has been changed to a clean one just before the operation. Now as to the enucleation itself, I have never discontinued the use of the left forefinger in the rectum, or even two fingers. I see no reason for abandoning this device, which makes the operation easier and quicker. I do not admit that, properly arranged, it adds at all to the risk of sepsis.

The right forefinger then should disrupt the internal meatus and can then select in turn the anterior end of each lateral lobe, separating it from the verumontanum, which is thus left intact with the ducts; by sweeping inwards and outwards round each lobe in turn towards the posterior aspect the lobes are liberated. This is the part of the operation where touch, practice and a correct mental picture of anatomy count so much. No doubt hæmorrhage is reduced by skill exercised at this stage; but, despite all care, it occurs and brings with it solicitous considerations for its arrest. In the early days it received no special consideration, and I remember that both Bird and Syme used to say that they did not mind loss of blood at the time so much as in those cases that did not bleed very much on the table. These latter bled more often to a worrying amount later. I remember that in the early days at Saint Vincent's Hospital I was temperamentally unable to subscribe to this comforting policy and devised for myself the method of using an iodoform gauze ball of suitable size, held by two silk threads, one emerging from the urethra and one from the wound. The former was pulled upon by the nurse or house surgeon until the patient emerged from anæsthesia, and thereafter as hæmorrhage arose. It was withdrawn in a few days by pulling on the suprapubic thread. I am confident that it saved much worry and saved some lives. I know that even now some of my colleagues use gauze packing as a hæmostat in the prostatic cavity, and special gauzes for this purpose are on the market, impregnated with lung extract. I have never used it, but in due course substituted the Pilcher's bag for my gauze ball.

I have never departed from this practice, because it seemed to fill all requirements nicely. I have heard the bag condemned because it gives great pain and that it also causes strangury. It may be that it has been used indifferently. I use a conical bag containing no metal parts. I see no need for them, because the collapsed bag can always be withdrawn by pulling on the inflating tube. I am careful to use a bag which is of appropriate size for the cavity in question, and I introduce its pointed end carefully into the prostatic cavity and infold the posterior trigonal lip well under it. Quite a large part of the base of the bag, of course, remains in the bladder. I think its use conduces to the formation of a satisfactory non-cicatrizing urethra. I inflate the bag with air only sufficiently to make a fair fit, and very rarely to the limit of its capacity. The draining tube of the bag passes down the penis and is steadily drawn upon until the patient is conscious. In the majority of the

cases the bleeding absolutely ceases by this hæmostatic pressure of an hour or two. If a longer pressure seems indicated by persistent oozing, the pressure is continued and is often tolerated easily, but morphine is sometimes given. I have kept this bag in place for as long as a week and have used it as an irrigator throughout, but usually it is withdrawn between the third and fifth day and no anæsthesia is ever necessary for this. I like the first bowel action to be well over before withdrawing the bag, and I avoid enemata during the early days. I suppose I have never turned to suture of the cavity as a routine because the use of the bag is swift; it promptly stops bleeding and enables the operation to be a short one, with the minimum of anæsthetic and least loss of blood at the time. Moreover, it is non-adherent to raw tissue and its removal causes no recurrence of oozing whatever.

The third method of hæmostasis is by suturing. It postulates a definitely full, open operation under sight with special lamp illumination of the bladder interior. It follows that the operation will occupy more time and more anæsthetic will be given. I submit also that more blood will tend to be lost at the operation than when the rapidly applied hæmostatic bag is used. I have seen Thomson Walker apply his hæmostatic sutures. It was an enjoyable sight. The patient was thin, the anæsthesia delightfully relaxing, and the hæmorrhage at the time was not excessive. Bleeding points were seized and tied, and then a running suture along the posterior two-thirds of the prostatic cavity completed the undertaking. I have tried this method and have come to realize that there must be a good relaxing anæsthesia. When the patient is very stout and, moreover, is stertorous with a *plus* abdominal pressure under anæsthesia, I know of no more difficult and tedious situation. It is to be noted that Walker describes at some length his method for controlling post-operative hæmorrhage, and these include another anæsthesia and gauze packing.

Now any discussion on prostatectomy would be incomplete did it not contain more than a passing mention of the work of Harry Harris, of Sydney. He has devised and perfected a suprapubic operation, the essential points of which are, after the ordinary careful enucleation, the placing of hæmostatic sutures which aim at also restoring an epithelial lined prostatic urethra with, at the same time, obliteration of the prostatic cavity. Incidentally the bladder and the abdominal wound are closed and drainage is carried out by urethral catheter for ten days. The operation, properly performed, provides a perfect remedy for the main danger, hæmorrhage. It has been said that this method of suturing will lead in many cases to late stenosis. Harris reports emphatically that this is not so, as proved by repeated cystoscopic examination and tests by bougie. I cannot see the real advantage of immediate closure of the bladder and wound. I am told that it shortens convalescence. I find convalescence determined more by the general improvement in the patient than by wound states. I think that those patients with a strong tendency to healing are very little, in point of time in hospital, behind those completely sewn up on the table; and those wounds that do not naturally heal rapidly from one cause or another, cannot remain sewn up even if treated so. As a compromise I think sewing the bladder alone worth a trial. Harris's figures are very good. He has a mortality rate of under 3% for 400 cases, but he is careful to point out that he does not operate unless sepsis can be excluded and unless the result of the carmine test is satisfactory. If I might summarize the situation, I should say that good results are attainable in more than one way. I regard suture hæmostasis as a sound surgical principle if it can be applied without loss of time or blood. But the man who usually employs suture should familiarize himself with the technique of pressure hæmostasis and be ready to apply it without delay in an emergency and, *mutatis mutandis*, the same should apply to the routine advocate of the bag.

A surgeon's methods are the product of his temperament, his environment and his training and experience. I think it likely that if I were beginning now I should adopt the method of prostatectomy that Harry Harris has taught us, mainly because of its hæmostatic value; but I should, I think, take the precaution of always having the Pilcher bag on the instrument table.

Now, as I look around, I see many physicians present tonight. I am conscious that much of what I have said is probably only of academic interest to them. But what is of first interest to us all is the question of the indications for prostatectomy. One factor strongly controlling the situation is the temperament of the patient. Some have such a fixed objection to surgery, either through fear or previous experience, that nothing of talk will bring them to it. None but the direst need in the way of relief of suffering wins consent, too long delayed. In other cases relatives will dominate the situation. Then again, some men declare they are so at the mercy of their affairs that they have no time for an operation. Your experience has, I have no doubt, taught you the suitable replies to all of these. Personally I have always shrunk from taking the whole of the responsibility of these cases on my shoulders. I think over-insistence unwise. I like to spend quite sufficient time in explaining to the patient the aspects of his case. If a man, otherwise well preserved, has an expectation of fifteen years' more life, judging by the average of all known relatives available, and if it is shown to him by repeated examinations that he has an increasing urinary obstruction, which within, say, two years, will enter upon a miserable fatality, he often chooses operation, because he has emphatically pointed out to him the lesser risks of an early decision. Others elect to "chance it", as they say, and go on until rendered miserable and then ask for relief.

The physician is most often faced with the difficulty of giving advice about the early signs and

symptoms of commencing prostatic enlargement. I think he would be wise if he were to appeal to a urologist for help. There should be a thorough rectal and cystoscopic examination, a urinalysis including efficiency tests; also the effect on the general health should be studied.

In the early cases where there is no residual urine and little effect as yet on the kidneys or general health, there is possible scope for the use of the resectoscope. Further investigation is necessary. But if nothing is done beyond lightening the overload of work and worry usually present, there should be a full reconsideration of the problem at regular intervals of a few months.

Those patients already showing several ounces of residual urine usually give some evidence of renal impairment and should be advised to have operation piloted with all known skill, but even here I allow the longevity factor full sway. I try to estimate what particular course offers the best chance of the longest life without suffering. Of those patients already in serious trouble I have already spoken fully.

As to direct contraindications, those in the urinary tract have already been considered. Concurrent thoracic disease is again best considered on a longevity basis and minimum of suffering. The least objectionable form of anæsthesia will usually surmount that difficulty in cardiac deficiency or bronchitis and emphysema, and it becomes a question of balancing up the maximum advantage. I have steered several asthmatic patients through prostatectomy, and one of rheumatoid arthritis, completely fixed and bedridden, all with great relief of suffering. Glycosuria is no bar, so long as it is intelligently managed before operation, and it has not infrequently permanently disappeared after prostatectomy. Twenty years ago I performed a Kraske operation on a man for rectal cancer; five years ago I removed his enlarged prostate for recurrent hæmorrhage and cystitis; he still lives, but refuses a comforting colostomy. All surgeons meet sooner or later the problem of dual pelvic disease in the form of well established prostatic obstruction and cancer of the rectum. I have tried attacking each disease first in different instances, and I think that the prostatic disease should be cured first if the longevity and temperamental factors render anything radical worth while.

I have chosen prostatectomy as a first subject for discussion in this section because roughly 30% of men are affected with enlargement of the gland, if they live long enough, and about half of these suffer by it sufficiently to require treatment.

I have dwelt at length upon the history of the treatment because of its interest and because it affords such a good object lesson to research workers in surgery. Our methods are constantly on the change, not always for the better, but there is the occasional dramatic advance. Can, for instance, the resectoscope offer us much? Will it ever be better than the forefinger? What can biochemistry ultimately do in calculus therapy? Urology has always fascinated me because of the abundance of its intellectual problems. The cases we meet in it should be all soluble if we try hard enough and long enough. Moreover, every case, followed to finality, will disclose the solution and enable us to recognize the key symptom, the earlier non-recognition of which led to temporary failure in diagnosis.

Urology, then, is the subject for an exact and unhurried mind. It is one in which the instruments must be very good and in which experience is vital. It requires the patience of an angel and an undying determination. It is only by the help of all of these that we can aim at perfection—not for the hope of gain, not from fear of punishment, but for perfection's sake.

FURTHER OBSERVATIONS ON THE ALLANTOIC MEMBRANE OF THE EMBRYO CHICK AND ITS X RAY REACTIONS.[1]

By WARNFORD MOPPETT, M.D., Ch.M. (Sydney),
From the Biophysical Laboratory, The University of Sydney.

THE allantoic membrane of the embryo chick has been employed for several years as test tissue for investigating the action of homogeneous X radiation produced by crystal diffraction.(1) A small window of shell is removed prior to exposure, leaving the subjacent white shell membrane intact, and subsequently the opening is repaired by fixing down a sterile piece of shell with wax. The reactions observed after three or four days' further incubation are usually "hypertrophy" or "atrophy", as previously described in full.(1) There is a third type of reaction, previously called "pseudo-atrophy" or "partial atrophy", which corresponds better with the erythema of radiotherapy. There are pronounced vascular changes, a certain degree of fibrous shrinkage and cellular infiltration, and a comparatively small peripheral reaction. This response is not usual; but it is observed under conditions where the resistance is very high, as with certain types of mixed radiation or with reactions produced through intact shell.

Goulston and Mottram(2) have succeeded in producing reactions in non-irradiated specimens with some appearance of spontaneity. They suggest, however, an infective origin and imply that a similar factor may have operated in causing reactions attributed to X radiation.(1) This paper is an extension of some revisionary work,(3) and the points at issue are whether "infective" reactions are likely to occur under the conditions of my experiments and, if not, whether it is possible to repeat the various phenomena of X ray action previously enunciated.(1)

[1] This work was carried out under the control of the Cancer Research Committee of the University of Sydney and with the aid of the Cancer Research and Treatment Fund.

Infective Reactions.

"Infective reactions" are apparently not peculiar to any particular laboratory, since they were readily produced here as in London.[4] They arise and their incidence and intensity rapidly reach a maximum when large numbers of prepared eggs are exposed in the stock incubator. There is a diminution or temporary cessation when the incubator has been thoroughly cleaned, and specimens exposed in a sterile enclosure do not usually react.

I exposed about 100 prepared eggs in an "infective" incubator for different periods up to twenty-four hours with the following result, expressed as a probability of death or reaction. Reactions were marginal hyperplasias with only one case of atrophy.

TABLE I.

The Probability of Death and Reaction when Eggs are Exposed in an "Infective" Incubator.

Time in Hours.	Probability of Death.	Probability of Reaction in Survivors.
0 (open and close)	0	0
2	0	0·15
3	0·1	0·2
4	0·3	0·6
6	0·6	0·9
24	0·9	—

If a reaction takes place after infection by a single organism one would expect the ratios of incidence to be directly proportional to the time of exposure; but the results of this experiment reveal a more rapid increase. Mr. Lyons, of the mathematical staff of the university, kindly investigated the problem, supposing that a minimum number (x) organisms are required. Then, if the probability of infection is a for an hour's exposure, it will be $4a$ for two hours and $16a$ for four hours, making some reasonable assumptions as to relative magnitudes. This fits the above results very well, but does not prove an infective origin, as the argument might be applied to the loss of x molecules of water or to the absorption of x molecules of an irritant.

Investigation of Various Stimuli.

It appeared desirable to isolate a definite causal agent, as otherwise one might reasonably suppose that the prepared egg was so sensitive a structure that any small stimulus would produce a reaction. As a preliminary step I investigated the effect of various non-specific stimuli. Three-hour exposures, both in a desiccator and in a saturated enclosure, failed to produce any abnormality.[3] The pressure of a sharp bead also failed to produce any abnormality after seventy-two hours' operation, so that dehydration and mechanical injury can have little concern in the phenomenon.

Painting the exposed shell membrane with wax at 67° C. is also without obvious effect. This is not a matter of poor conduction, because sealing wax at a slightly higher temperature readily causes a burn, although there is less tendency to "wet" the membrane.

I shall consider later the high resistance to β radiation and to mixed X radiation. Certainly the structure is about fifteen times as sensitive as the hairy skin of the mouse,[5] but in no instance is there any approach to the unique sensitivity to suitable homogeneous radiation.

In exploring the spectrum I employed exposures of two hours; but powerful sources give homogeneous ray reaction in eighteen minutes. One hour is a convenient average time to adopt.

During exposure to a radiator type of tube the specimen receives radiant heat, some visible light, and possibly a small amount of ultra-violet light. A brief investigation was made by exposing specimens through a slit 0·5 by 1·0 centimetre to radiation from a red hot plate 5·0 centimetres distant, a 50-watt lamp 15·0 centimetres distant, and a high frequency ultra-violet applicator 5·0 centimetres distant. As no change was produced with one hour's exposure, it was obvious that there was no extraordinary sensitivity to such radiation and no possibility of fallacy on the above lines.

Unfortunately there has been some misunderstanding on the subject of controls, a term which applies to a prepared egg in close association with the irradiated specimens and not to exposures made in the stock incubator.

Goulston and Mottram[2] obtained very infective conditions in the incubator and then they advanced an aseptic technique which they only tested for two-hour periods. Scott[6] exposed controls in the irradiation box for periods up to six hours and obtained a high percentage of atrophic reactions. I would regard this as very unsatisfactory; the position may be clarified by drawing up some definite standard. X ray work should be attempted only if two-hour controls show a slight hyperplasia in not more than 10% of cases and only 10% of eggs exposed for twenty-four hours in the stock incubator show atrophy. It is also advisable to employ fairly large windows, so that infective reactions may be recognized by their characteristic marginal distribution.

I drew attention to the possibility of a slight "traumatic" reaction in an early paper;[7] but two-hour controls were normal possibly because small numbers were used and work was carried out in a clean new building. Rather more care appears necessary since the intensive study of "infective" reaction, although fifteen three-hour test exposures in the irradiation box caused only one slight hypertrophy.[3]

Four specimens placed in a sterile jar for twenty-four hours showed no reaction, whilst an exposure of ninety hours caused a slight œdema, which was probably quite distinct from the effects obtained with short exposure.

Remarkable freedom from reaction is obtained when specimens are kept face down during exposure. Hunt[4] records a number of such "windows" resting on cotton wool, and in my β ray controls[8] they rested on a lead block; in both cases dehydration *et cetera* would be little affected.

In my cases exposure for an average period of forty hours caused no reaction in ten, and one definite and three very slight hypertrophies.

There is thus much evidence that non-specific irritants or mere exposure do not cause a reaction. The problem of isolating a specific causal organism has been undertaken jointly with Dr. N. E. Goldsworthy, of the bacteriology department, and we hope to record our work in a later paper.[9]

X Ray Reactions.

The remainder of this paper is concerned with the action of X radiation on the membrane or, rather, with a comparison of the action of different radiations. The general methods of establishing the causal relationship of the X ray reaction have already been discussed and a simple and elegant proof is obtained by cutting a second control window in the irradiated specimen (Figure I).

FIGURE I.

Scott has advanced a very serious criticism[6] of my claim that a pronounced differential effect occurs between mixed and homogeneous rays.[1] He considers that the resistance is very high for short exposures to intense mixed radiation, but that a state of critical sensitivity is reached after about three hours, so that a very small amount of radiation, either homogeneous or mixed, may produce a reaction.

Unfortunately all Scott's radiations appear to be similar. The homogeneous rays contain the whole *K* spectrum of tungsten, probably with a considerable amount of soft radiation from ordinary scattering, since the crystal (curved mica) is close to the specimen and the critical angle is only one-half of a degree. The mixed radiation is generated in such a manner as to bring the *K* lines near the peak of the energy curve, and the soft radiation is mainly absorbed in the comparatively thick wall of a Müller tube. Scott actually quotes a similar absorption coefficient for the two radiations, and his feeble mixed radiation would again be similar, although a little more homogeneous, after the additional filtration by a layer of paraffin of considerable thickness.

Scott's work has little bearing on the present investigation, although some of his results appear to be confirmatory. Indeed, his conclusion that there is no repair, his unsatisfactory controls, and the frequent occurrence of atrophy lead one to suggest that he failed to obtain any X ray reaction, except in so far as a slight injury may provide an entrance for a virulent infection.

The question arises whether such an explanation may apply to all supposed reactions. It is difficult to obtain conclusive proof of a negative contention; but the following points require consideration:

1. Contrary to Scott's results, homogeneous ray reactions may be obtained after quite short exposures, half an hour being frequently employed.
2. Characteristic histological results will be described.
3. Repair was evident because it took twice as much energy to produce a reaction in four hours as in one and a half hours.
4. Exposures to a beam of pure β radiation caused no reaction up to ninety-six hours. In order to make a comparison with X ray dosage one must consider absorbed energy. The effective X ray dose absorbed in half an hour was 0·67 erg by an ionization method and 2·0 ergs by a thermal method. The former provides a better comparison with the dose of β rays, which was determined by ionization. The β ray energy absorbed in half an hour was 9·0 ergs or 1,728 ergs in four days. This indicates that a stimulus of inadequate intensity will never affect the membrane, although the ionizing power per unit time was several times greater than that of the homogeneous X ray.

It may be of interest at this stage to reproduce a number of experiment records in tabular form, with estimations of total incident energy on a thermal basis.[3] (See Table II).

TABLE II.

Radiation.	Exposure Period. Hours. ¼	½	¾	1	1¼	2-3	Total Incident Energy. Ergs per Square Centimetre per Hour.
Mixed ray, intact shell, 140 kilovolts			O	R	$R_{(1)}$		3,000,000
Mixed ray, 100 kilovolts	O	O	O	O	R		
	O	O	O	?	R		1,000,000
Mixed ray, 120 kilovolts	O	O	R	R	R		
	O	R	R	R	R		1,000,000
Homogeneous, 0·55 Angström unit	O	H	HA	A	$A_{(2)}$		400
Feeble mixed				O		$O_{(3)}$	3,000
				O			
				O			
Homogeneous 0·55 Angström unit ground shell						R	threshold about 1,000

The first line demonstrates a reaction in intact eggs with a threshold exposure of one hour, and the footnote $_{(1)}$ indicates a reliability of 6/8. A fairly hard radiation was used so that fluorescence from the shell would be relatively unimportant. It will be seen that the dose was only three times greater than of a mixed radiation generated at 100 kilovolts and acting for one hour on a window. It is necessary, however, to specify the energy curve of the mixed radiation, because a higher voltage, 120 kilovolts, and similar incident energy produced a reaction in half an hour, although the absorption must be less.

It is thus difficult to say to what extent the window increases the sensitivity, because the shell inevitably causes a change in the radiation used for comparison.

The next line shows the threshold for homogeneous radiation, the footnote $_{(2)}$ indicating that of seven exposures at the greatest time, six were atrophic and one hypertrophic in a resistant specimen.

Scott has based his attack on the theory of antagonism under the peculiar impression that two to three hours are required to produce a homogeneous ray reaction. The above example is quite in accord with previous evidence,[1] which shows that it is quite easy to obtain weak homogeneous and strong mixed radiation acting in equal times. More important still, one may employ various combinations of exposure to show that time represents only one factor and that the reaction depends on homogeneity and dose.

Check exposures were made with the apparatus shown below (Figure II). When the crystal was

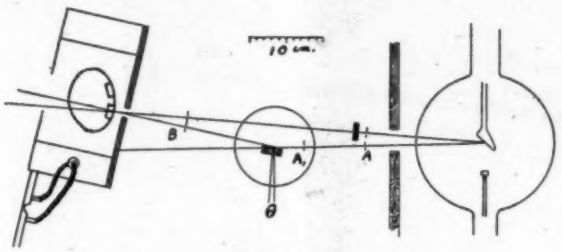

FIGURE II.

set to give a wave-length of 0·55 Ångström unit, atrophy was produced in one hour when the tube was operated at 40 kilovolts and 2·5 milliampères. One then attempted to show that a three hours' exposure to intense mixed radiation would not produce any visible change. It may be assumed that if a radiation does not act in this period, it will never be effective, owing to the natural repair of the tissue.[1] When constant potential was employed, however, there was a definite reaction, even when the tube was operated at 1·5 milliampères. It was necessary to employ a simple (sine curve) transformer in order to obtain a three-hour blank. This was probably associated with a more extensive spectrum. Photographic films showed that both incident radiations covered the same area, but the feeble effective homogeneous beam just marked the film in half an hour, whilst the intense non-effective mixed beam gave a dense blackening in half a minute. The next line in Table II indicates that a feeble mixed radiation scattered from the surface of paraffin is non-effective for one hour exposures[3] (see Table III).

TABLE III.
Feeble Mixed Rays.

Distance in Centimetres.	Relative Intensity.	Intensity Corrected for Atmospheric Absorption.	One Hour.	Two Hours.	Three Hours.
20	1,000		O	R slight	R
25	640		O	O	
30	445		O	O	
40	250		O	M	
60	110		O		
100	40		O	O	
150	20		O		
200	10	9	O	O	
300	5	4	O	MO	MO
400	2·5	2	O	O	O

Scott makes a suggestion that feeble mixed radiation is effective after periods of two to three hours. The real problem is that of a zone phenomenon. Given an effective mixed radiation, there can be no doubt that reactions will cease if the intensity is diminished, the time of exposure being kept constant. In order to see whether there is a second threshold for low intensity, one mounted the egg box on a movable trolly so that it could be placed at various distances from the tube.

The radiation was furnished by a thin-walled universal Coolidge tube energized by a simple transformer at 40 kilovolts and 3 milliampères and a slit-shaped aperture 1·0 by 5·0 centimetres was placed in front of the egg with a screen of aluminium 0·01 centimetre thick to shield off the heat in the case of close exposures.

The results are expressed in Table III, which gives the distance, the relative intensity and the result: O represents no reaction, R represents pseudo-atrophy, and M a slight "infective" reaction which was marginal in distribution and not in the position of the incident radiation.

The first criticism would be that there are too many "infective" reactions. They arose when one was making an intensive study of the infective process and the incidence was checked by changing cotton wool and flaming out the irradiation box. It will be apparent that such slight changes do not interfere with work, providing the actual irradiated region is not involved. An energy measurement at 20 centimetres gave 1,800 *R* or 900 *r* per hour approximately. The membrane therefore shows a surprising resistance, apparently associated with a very extensive spectrum of soft radiation. Hypertrophy and atrophy appear to be associated with a homogeneous or semi-homogeneous radiation, and in the above case one observed pseudo-atrophy, which is the characteristic reaction to mixed radiation (see Figure IV). In the four metre exposures the dose would be approximately 1·8 *r* per hour, and there was no evidence of a zone phenomenon. Previously this had been considered as a fallacy in the theory of antagonism.

The last line of Table II records a homogeneous ray reaction obtained by grinding away a portion of shell to a negligible thickness before incubation. One employed twelve controls in this investigation, and nine gave no reaction, one gave a doubtful, and two gave slight reactions, which appeared as a slight cellular infiltration under the microscope.

The four irradiated specimens were distinct, however, two being pseudo-atrophy and two mainly hypertrophic (see Figure V). One may thus produce homogeneous ray reactions without a window, but the method is unsatisfactory, except as a demonstration. It will be observed that the threshold dose is increased in about the same ratio as for mixed radiation acting through the intact shell. It may be asked why homogeneous radiation will not act in the intact egg if one increases the dose by a factor of 3 *plus* an allowance for absorption. The probable explanation is that the fluores-

cent radiation in close proximity to the calcium atoms in the shell produces the equivalent of mixed radiation.

Sensitivity.

Some of Scott's work indicates that there is a real increase in sensitivity with exposure and a full investigation will be undertaken later. The methods of painting with vaseline or sealing with paraffin paper, which may furnish a valuable technique for long exposure, also require an accurate estimate of any variation in sensitivity before use.[9] An investigation of the variation of sensitivity with exposure *et cetera* are maintained consistent. The allantoic membrane is a unique tissue which may be conveniently adapted to the X ray spectrometer, and if fallacies occur before one has had adequate experience, the position is similar to that of tissue culture or any other experimental material.

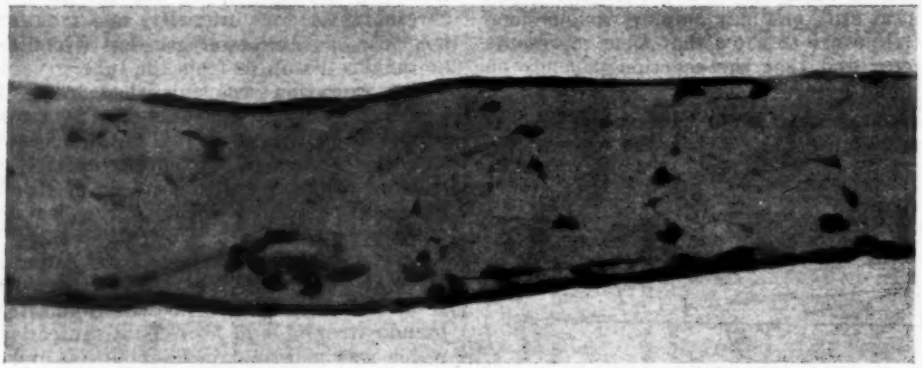

FIGURE III.
Normal allantoic membrane in transverse section. All the following figures are approximately × 150.

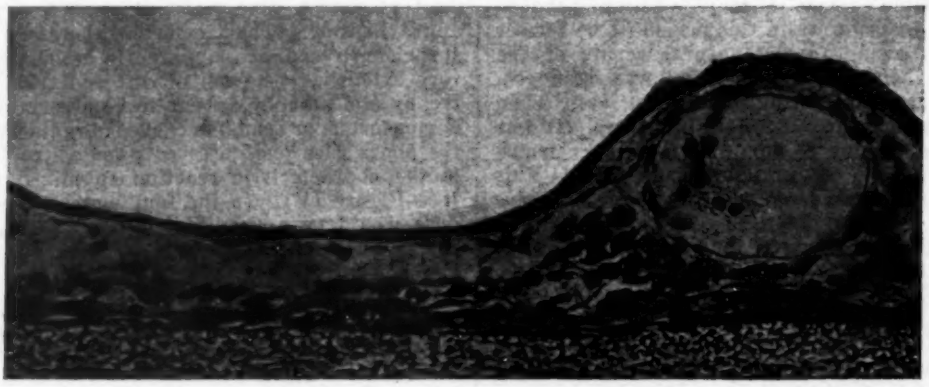

FIGURE IV.
Pseudoatrophy seventy-five hours after exposure to mixed radiation—a portion of the non-living shell membrane below.

the period of incubation is recorded in the following table. The wave-length was 0·55 Ångström unit and two-hour exposures were employed at a comparatively low intensity.

TABLE IV.

8D.	9D.	10D.	11D.	12D.
A	A	A	H	H
A	A	H	H	O
A	A	H	O	O

There is a surprising diminution in sensitivity for the later periods of incubation, but the effect is here exaggerated because the rate of injury was only a little greater than the rate of repair. X ray mortality appears to follow a somewhat similar variation.

Revisionary work has shown the ordinary technique to be quite reliable so long as age, period of

A Comparison of the Reactions Produced by Different Wave-Lengths.

X radiation may be regarded in general terms as a form of injurious stimulus to living cells. A review of the changes produced in the allantoic membrane by different "homogeneous" wave-lengths furnishes evidence for a more precise relationship. This is especially the case where one may distinguish variations in quality of reaction which are to some extent independent of dosage. Within limits it is possible to speak of atrophy and hypertrophy producing wave-lengths and in the latter case it is even possible to single out a particular tissue or

cell group, such as the epithelia or potential fibroblast.

This investigation, comprising about one hundred experiments, bears on the general problem of selective action, but the immediate objective was sought by tracing the early development of various reactions in an attempt to distinguish between primary and secondary effects. The spectrometer plan is given above, and two-hour exposures were

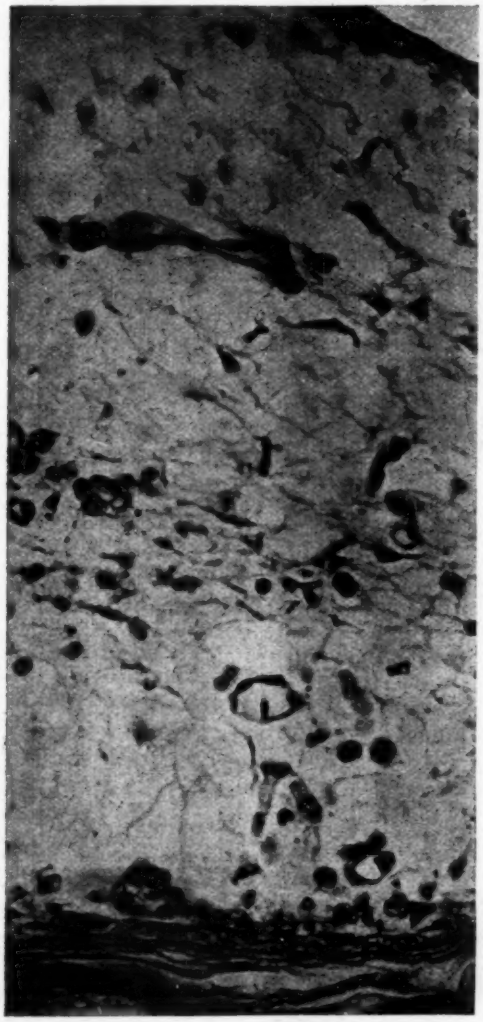

FIGURE V.

Hypertrophic reaction seventy-five hours after exposure to homogeneous radiation through a region of shell rendered thin by grinding.

employed in order to produce a mature reaction, as opposed to a slight irritation, whilst the incident energy would be of the same order—about 400 ergs—for all experiments, since one avoided the characteristic lines and the "peak" at $V_{max.}$

Atrophy.

A wave-length of 0·55 Ångström unit approximately has been described as atrophy-producing, since with the above dosage there is a rapid and progressive shrinkage and autolysis of the tissue involved. Figures VI, VII, VIII and IX give a view of the progress of the change and the associated development of the hypertrophic raised edge. After six hours' incubation there is a central region of brownish discoloration, probably without circulation, whilst the peripheral vessels are congested. Microscopic section shows a pronounced shrinkage of the membrane and cellular death is evident, since one can distinguish nothing but granular *débris*. The adjoining normal membrane shows only congested vessels and a few infiltrating leucocytes. After twenty hours' incubation one may distinguish proliferative changes in the "raised edge", whilst in Figure VIII, representing fifty hours' incubation, there is a definite hypertrophy and a commencing overhang. At this stage the atrophic membrane is greatly shrunken, although both epithelial layers may be distinguished. The rate of autolysis appears to depend on the primary injury, and in Figure IX a fifty-hour specimen which has received a larger dose, staining property is lost and in places the two epithelial layers are fused into a single thin band. This variation in the rate of autolysis presents a strong argument that the destructive effect is primary as opposed to a necrosis secondary to vascular interruption. Moreover, the border of the six-hour specimen is sharp and straight, and this does not suggest a vascular distribution. However, vascular thrombosis also plays a part, since circulation is arrested over the whole atrophic area within a very short period. This indicates a primary effect on the vascular endothelium, and evidence points to the fact that this radiation has a direct and rapid destructive action on all the cells concerned. (Previous references to preliminary hypertrophy may have been confusing, but this consists of a few groups of epithelial cells, and it is observed only when the dose is just about the threshold value.) On the other hand, atrophy in "infective" reactions usually represents a breakdown in the centre of a hypertrophic mass and it is almost certainly secondary to a failure of nutrition. The raised edge is obviously a secondary process resulting from a contact with necrotic material, though scattered radiation and deflected β particles may also determine some irritant action.

Hypertrophy.

Previous papers have given evidence for the existence of specific stimulation associated with particular frequencies, but early changes were not studied.

Mottram has laid great stress on the fact that all reactions are secondary to injury, and it is admitted that an invisible physico-chemical injury must comprise a preliminary stage of the process.

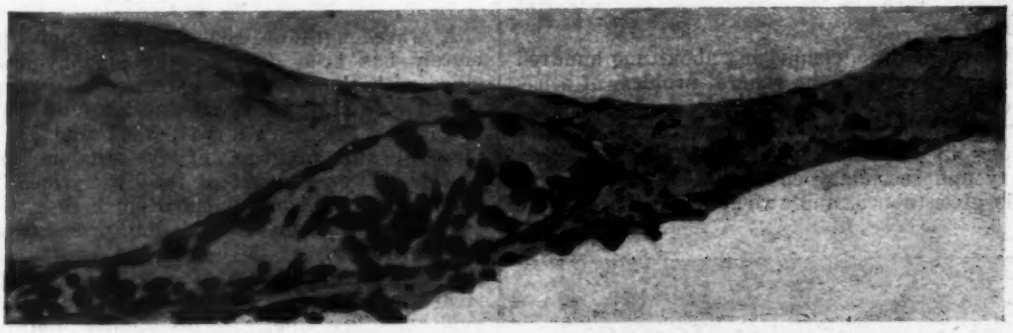

FIGURE VI.

Border of an atrophic reaction six hours after exposure to a wave-length of 0·55 Ångström unit approximately. Right shrunken disintegrating membrane. Left practically normal apart from enlarged blood vessel.

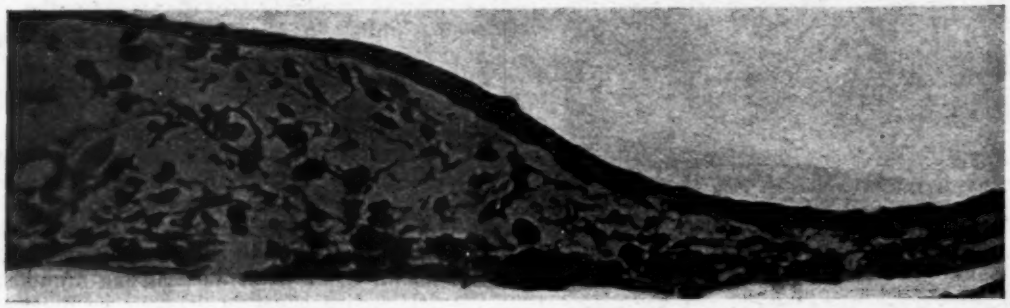

FIGURE VII.

Border of an atrophic reaction twenty hours after irradiation. Left cellular infiltration in commencing peripheral hypertrophy. Right progressive shrinkage and degeneration.

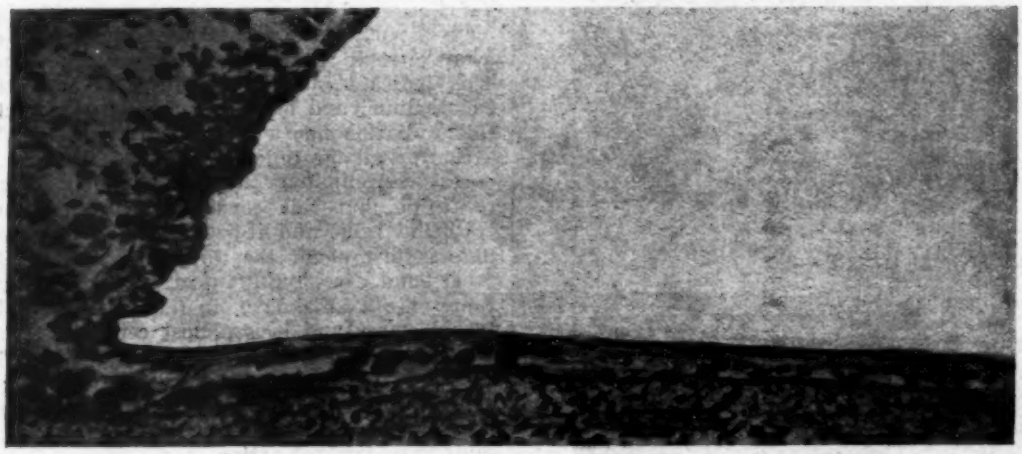

FIGURE VIII.

Border of an atrophic reaction fifty hours after irradiation. Left hypertrophic edge commencing to overhang. Right progressive shrinkage and degeneration. Shell membrane below.

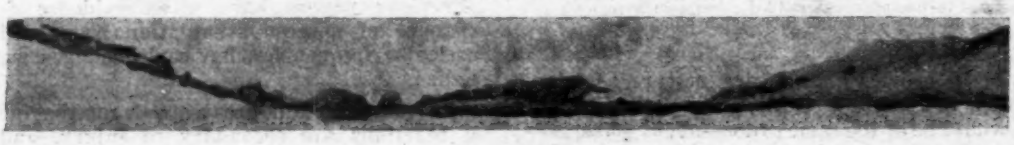

FIGURE IX.

Atrophied membrane fifty hours after irradiation. With increased dose the degeneration is accelerated. Traces of the epithelia may be seen, but the staining property is lost.

FIGURE X.
Centre of a hypertrophic reaction twenty hours after exposure of a wave-length of 0·65 Ångström unit approximately. A focus of early fibroblastic differentiation.

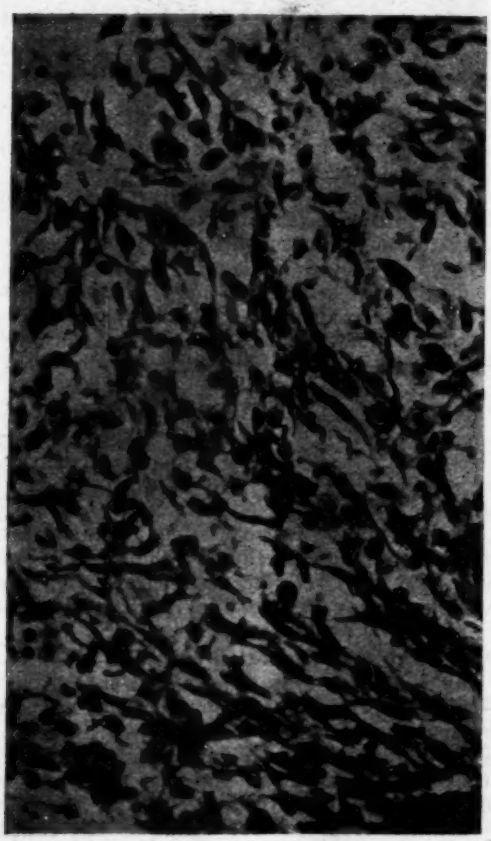

FIGURE XI.
A large fibroblastic focus fifty hours after irradiation.

FIGURE XII.
Mature fibrous reaction one hundred hours after irradiation.

In Figures X, XI and XII, representing hypertrophy with fibrous differentiation after exposure to a wave-length of 0·65 Ångström unit approximately, there is no microscopic evidence of initial cellular damage. After twenty hours' incubation there is an œdematous thickening of the mesenchyme with localizations of heavily staining cells. After fifty hours these cells have definitely assumed the spindle form of the fibroblast and there is a general orientation, usually in gradual curves. With one hundred hours' incubation there are dense fibres surrounding the remaining mesenchymal cells and the reaction appears to form a barrier to invading epithelial cells.

A wave-length of 0·9 Ångström unit approximately appears to have a definite stimulating property on epithelial tissues. The twenty-hour specimen, Figure XIII, shows an œdematous thickening of the mesenchyme with a folding of the extending endoderm,[1] whilst the ectoderm, below, shows an obvious hypertrophic change. The fifty-

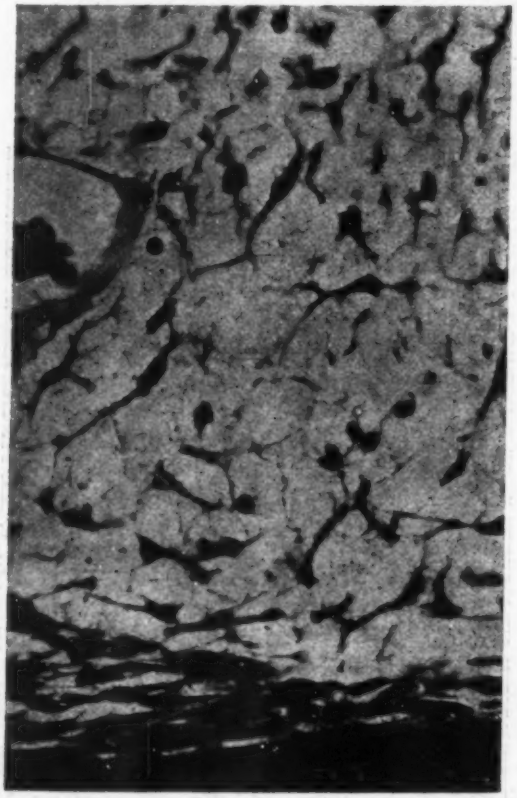

FIGURE XIII.
Hypertrophy (twenty hours) (0·9 Ångström unit) early proliferation ectoderm—œdematous thickening mesenchyme.

hour specimen shows a very obvious stratified squamous ectoderm, whilst the mesenchyme is comparatively unaffected compared with the corresponding "fibrous" specimen. After one hundred and twenty hours' incubation the epithelial cells dominate the whole picture and secondary degeneration has taken place in the dense masses (Figure XV).

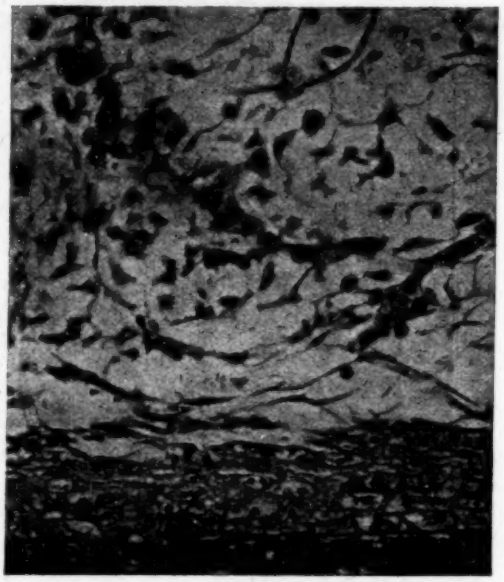

FIGURE XIV.
Epithelial hypertrophy (fifty hours)—little mesenchymal change.

Discussion.

The point at issue is the extent to which a definite type of reaction may be controlled by the exciting wave-length. Admittedly all hypertrophic reactions are somewhat mixed, probably because one system of active cells inevitably influences its neighbours. There is also a certain variability among different specimens, but the present results are a notable confirmation of a previous inference that one may determine primary effects of varying quality. The optimum dose, wave-length and homogeneity are not by any means known.

One has already described the raised edge of the atrophic reaction as an interesting secondary phenomenon, and there remains the hypertrophic response to an "inadequate" dose of "destructive" radiation. Such effects are purely hypertrophic when slight and represent a slight irritative action, but more pronounced effects (Figure XVI) show obvious areas of cellular destruction after twenty hours' incubation, and the final result is undoubtedly secondary to a partial injury.

Reliability.—In connexion with this investigation it may be noted that spontaneous œdema of the membrane occurs in multiple patches as a rare developmental anomaly and there are occasional uncovered lacunæ, usually with a pigmented margin, but all such phenomena may be recognized at a glance. A careful reinvestigation of the microscopic appearances from control windows has failed to show any "spontaneous" hypertrophy, except for a slight and non-progressive epithelial thickening

[1] Folded endoderm is not shown to save space.

adjacent to a hæmorrhage produced in removing the shell. The density of primitive fibrillæ is, however, subject to some variation. With proper technique the membrane appears to give reliable results and the comparison of one radiation with another should give results free from biological fallacy after adequate repetition.

Theoretical Bearing of this Work.—The theories of X ray action at present favoured involve a "burst of ionization" in a sensitive region of the cell, and results may vary in degree, but scarcely in quality. The present work associates the biological action of X rays with certain special "key" atoms, and it would appear that one such atom may determine destruction and another proliferation. One is also led to the conclusion that epithelial cells or the potential fibroblast may contain different key atoms, and there is a possibility that the method of micro-incineration may furnish some indirect evidence on this point.

FIGURE XV.

Epithelial hypertrophy (one hundred and twenty hours). Masses invade mesenchyme—secondary degeneration. A small section from centre of reaction.

Conclusions.

1. The allantoic membrane in "prepared" eggs does not react in the absence of a definite stimulus.
2. There is evidence that reactions may arise owing to infection, and a bacteriological investigation will be described later in collaboration with Dr. N. E. Goldsworthy.
3. One must reaffirm the existence of antagonism, since Scott's argument relates only to one rather unsuitable type of radiation.
4. Destruction or stimulation and cellular differentiation may be determined to some extent by the wave-length used.

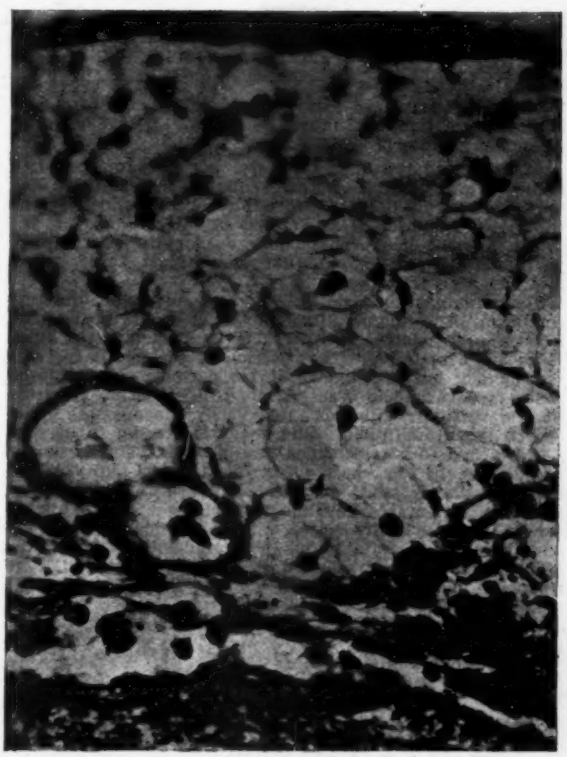

FIGURE XVI.

Hypertrophy (twenty hours) to inadequate dose of destructive radiation—initial degeneration.

5. Various groups of cells (epithelia) contain different key atoms capable of responding to suitable homogeneous radiation.

References.

(1) W. Moppett: "The Differential Action of X-Rays on Tissue Growth and Vitality: Part I", *Proceedings of the Royal Society*, B, Volume CV, 1929, page 402; Volume CVII, 1930, pages 493, 303, 308.

(2) D. Goulston and J. C. Mottram: "On the Technique of Exposing the Chorio-Allantoic Membrane of the Chick Embryo for Experimental Purposes", *The British Journal of Experimental Pathology*, Volume XIII, 1932, page 175.

(3) W. Moppett: "An Examination of the Validity of Conclusions Drawn from Experiments in which the Allantoic Membrane of the Chick is Exposed to X-Radiation", *Journal and Proceedings of the Royal Society of New South Wales*, Volume LXVI, 1933, page 434.

(4) E. S. Hunt: Awaiting publication, "A Summary of Changes Noted in the Allantoic Membrane of the Chick in 500 Experiments".

(5) W. Moppett: "The Reaction of Living Tissues to Homogeneous X-Radiation Produced by Crystal Diffraction", *Proceedings of the Royal Society*, B, Volume CVIII, 1931, page 503.

(6) C. M. Scott: "The Biological Action of Homogeneous and Heterogeneous X-Rays", *Proceedings of the Royal Society*, B, Volume XCII, 1933, page 365.

(7) W. Moppett: "An Investigation of the Reactions of Animal Tissues Exposed to Monochromatic X Rays of Different Wavelengths", THE MEDICAL JOURNAL OF AUSTRALIA, April 11, 1925, page 364.

(8) W. Moppett: "The Allantoic Membrane of the Chick Exposed to Beta Radiation", *The British Journal of Radiology*, Volume V, Number 52, 1932, page 342.

(9) N. E. Goldsworthy and W. Moppett: Awaiting publication, "Infective Reactions in the Allantoic Membrane of the Embryo Chick".

Reports of Cases.

A CASE OF HUNTINGDON'S CHOREA.

By S. J. CANTOR, M.B., B.S., (Melbourne),
Mont Park, Victoria.

P.D., A FEMALE, aged forty-seven years, was admitted to the Mental Hospital, Sunbury, on June 13, 1933, because of mental symptoms.

According to the family history, her grandmother died from "nerves and St. Vitus's dance"; her mother died from chorea. A brother suffered from shell-shock at the war Her daughter is said to be irritable.

The ailment has been coming on for the past twelve years; it has been worse during the last three years. She has been temperate.

She is in apparent good health, except for her choreiform condition. The tongue is tremulous and is deviated to the left on protrusion. The heart is unaffected. The knee jerks are over-active. The reaction of the pupils to light is sluggish, but accommodation is normal. The plantar reflex is flexor. The Wassermann test yields no reaction. She is restless, with continual jerky movements. Her speech is unintelligible. She keeps muttering to herself. She has had to be restrained at times, as she falls out of bed or out of her chair. Her memory is faulty. She has paræsthesia, and imagines she is bitten by insects. She is disorientated in time and place. She is unable to walk because of the chorea. She is emotionally unstable, and becomes very agitated with increased choreiform movements at times; she is occasionally depressed. At times she has been impulsively violent. There is sequential mental enfeeblement.

Sodium phenobarbital has been administered to control extreme restlessness.

The patient has since died.

Acknowledgement.

These notes have been made available through the courtesy of Dr. D. Cade, Medical Superintendent of the Mental Hospital, Sunbury.

Reviews.

OTITIS AND MASTOIDITIS.

IT is wise that a book written on a special subject of medical practice by a specialist in that subject for the express purpose of assisting the general practitioner should give definite courses of procedure for diagnosis and treatment rather than be a discussion of different theories and practices. This is the method adopted by N. Asherson in "Acute Otitis and Mastoiditis in General Practice", described as "a manual for practitioners and students".[1]

This book is obviously based on personal experience. It is well printed, the subject matter is arranged in orderly sequence and the language used is clear and simple. This makes the reading of the book a pleasure and the line of reasoning easy to follow. The index at the end adds to its usefulness as a work of reference for the general practitioner.

The book is liberally illustrated with coloured plates, photographs, diagrams and drawings; most of them are original and should be very helpful to a proper understanding of the subject under consideration. In a book of this nature there must necessarily be some statements which will not be universally accepted as correct, but in this instance they are very few and are mainly of but minor importance. For example, everyone will not agree that "three months is an average time before a patient should return to any routine work of a strenuous physical nature" after a simple mastoidotomy. The directions given for after-treatment of the operation wound may be satisfactory in the case of an emergency operation by a general practitioner, but in many instances can be improved upon by the experienced otologist. Again, the instructions given for myringotomy, to "incise from above downwards with a bold, firm sweep", may be criticized. Most otologists incise from below upwards, and there should not be too much "boldness and firmness". There is an excellent description of the indications for myringotomy, which is well worthy of study, as unnecessary myringotomy can be productive of harm that is sometimes serious. The chapter on ætiology of acute *otitis media* is important. There are so many parts of the book worthy of quotation that a selection cannot be made. A brief description is given of the simple mastoid operation, as the general practitioner should be able to drain a case of acute mastoiditis in an emergency.

[1] "Acute Otitis and Mastoiditis in General Practice: A Manual for Practitioners and Students", by N. Asherson, M.A., M.B., B.S., F.R.C.S.; 1934. London: H. K. Lewis and Company, Limited. Crown 8vo., pp. 328, with illustrations. Price: 10s. 6d. net.

ALCOHOL.

PROFESSOR BURRIDGE'S recent treatise, "Alcohol and Anæsthesia", is concerned for the most part with an exposition of his theory of physiological psychology.[1] The theory is maintained with a wealth of assumption and inconsequential reasoning. The dual mechanisms of adsorption and colloidal aggregation are invoked to explain the reactions of a perfused heart to alcohol. These two sources of energy potential are termed kinesophores A and B. Muscle responses are considered to express the cooperated activities of a neural and a psychic structure in nerve cells. These structures are apparently correlated with kinesophores A and B. The existence of higher and lower levels in the nervous system is considered to be disproved by the fact that different nations find virtue in different forms of social conduct. Kinesophores are thought to explain the facts otherwise interpreted by the doctrine of nervous levels. Kinesophores also are considered to be the basis of the antagonism between emotional and reasonable thinking. Also alloys of kinesophoric action are thought to explain degrees of perceptual intensity and the limited potential energy of the kinesophores to determine the limits of mental power. As laboratory results are stated to lead one to doubt the capacity of alcohol to diminish directly the supply of judgement-kinesophore in the ordinary human being, Professor Burridge apparently would have us believe that a drunken man's judgements are sound.

Elsewhere we are told that the action of alcohol is exerted exclusively on the neural structure, apparently the judgement-kinesophore. Therefore the laboratory results should prove that alcohol has no action on the ordinary citizen. Professor Burridge considers that current doctrines concerning synapses can be held only by those who possess inadequate knowledge of the properties of rhythmical structures. Yet synapses are essential and become the critical factors if neurones possess independent rhythms. His theory therefore is conformable with the Lucas-Adrian theory of synaptic function. The physiological basis of an idea is considered to be a group of nerve cells rhythmically active in unison, each group dancing its own dance to its own strength, yet he insists that moral ideas, virtues, and vices are not localized. Having deduced that one man's meat is another man's poison, Professor Burridge vaguely suggests that legislation in regard to alcohol should be based upon this principle, but refrains from discussing any practical method of classifying individuals for the purposes of such an act.

[1] "Alcohol and Anæsthesia", by W. Burridge, D.M., M.A.; 1934. London: Williams and Norgate. Demy 8vo., pp. 65. Price: 2s. 6d. net.

The Medical Journal of Australia

SATURDAY, NOVEMBER 17, 1934.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction, are invited to seek the advice of the Editor.

BIBLIOGRAPHIC REFERENCES.

FROM time to time it becomes necessary to refer in these pages to subjects that have been discussed on previous occasions. In regard to the collection of references by authors this is unfortunately imperative. The questions that authors have to consider are, first of all, whether references are necessary; secondly, if references are required, what reference should be made; thirdly, what particulars should be given.

Authors should recognize that it is not necessary to give chapter and verse for every statement that they make. Views that are well known and facts that are proven need not be, as it were, vouched for by an author. Most readers have some knowledge of what is known about the ordinary subjects in medical science. However, to append a long list of unnecessary references is in some ways a form of conceit and betrays a desire on the part of an author to impress readers with an erudition that he may not possess. Moreover, such references take up space in a journal that could with advantage be used in some other way. When a subject is being discussed historically or from varying points of view the matter is different. References will show how the present conception of the subject has been evolved, how one investigator after another has added something to the common knowledge, how certain findings have proved to be of little or no value, and how the writer of the article was led to approach the subject and perhaps to formulate his ideas.

Having made up his mind that references should be appended to an article, the author has to determine what references he should include. It should be superfluous to state that reference should be made only to such articles as throw some light on the subject under discussion. Secondly, an author should in no circumstances include in his references an article that he has not utilized in the preparation of his own contribution or that he has not consulted. To copy from another author references that have not been verified and consulted is dishonest; it is plagiarism. Further than this, it may be definitely misleading, for the author from whom the reference is copied may have made a mistake in his quotation. All those who have searched the literature for information will remember occasions when they have been unable to find a paper mentioned as a reference. Mistakes are easily made by authors, and errors in printing are easily made. If an author states frankly that he has taken references from another author and that he has not verified them, no charge of plagiarism can be laid at his door.

The decision as to what particulars should be given in references will depend on the style adopted by the journal for which the article is intended. Every journal adopts a style, and as far as possible this style is not varied. There is nothing incongruous, as some medical practitioners seem to think, in attempting to reach a high literary and journalistic standard in a medical journal. The style adopted by this journal in the setting out of authors' references is complete and has been deliberately chosen. This our readers owe to the late Henry William Armit. Initials of an author are included for the obvious reason that many people have the same surname. For example, the name Pasteur may be quoted. Any reader seeing the name Pasteur will at once think of the famous Louis Pasteur; but there have been other medical writers of this name. The same holds in regard to almost any other name in medical literature. The full title

of an article is given in the first place so that there shall be no mistake in the particular quotation and, secondly, so that readers will at once see whether the article in question is one that they will wish to consult for themselves. The name of the quoted journal is written in full to conform to the style of avoiding abbreviations adopted throughout this journal. Full particulars of date, with, if possible, year, volume, month and page, are given so that originals may be readily found. If a mistake has been made by an author in the year, the stating of the volume will enable the reader to find the paper he is looking for. A final point that needs emphasis is that if an author has used an abstract of a paper as his source of information, this should be stated and both the original journal and the journal in which the abstract has appeared should be named. An abstractor may easily make an incorrect statement in his summary of someone else's views; this has, to our knowledge, happened on more than one occasion in matters of considerable importance.

This statement of the reasons for care and precision in the setting out of references has been made with the object of helping contributors to this journal and to avoid the necessity for sending their typescripts back to them that their references may be completed. Cooperation is as necessary between authors and editors as it is between practitioners of different branches of medicine.

Current Comment.

THE INFLUENCE OF NUTRITION UPON RESISTANCE TO INFECTION.

THE possibility that resistance to infection may be improved by diet is a comparatively recent idea, and one that has proved as attractive to the scientific worker as it is to the lay Press. The scientist sees in it a rational method of attacking the problem of disease, while popular versions of the idea have an irresistible appeal for the general public. The average newspaper reader is constantly informed of the ease and simplicity of avoiding all ills by eating vitamins, milk, yeast, meat extracts, lemons, raw vegetables, and wholemeal bread, and both lay and medical Press are brightened by enthusiastically advertised proprietary preparations with robust and melodious names. Julian Huxley voices popular opinion in his recent book "Scientific Research and Social Needs" when he writes: "The research of the last dozen years has really solved the main scientific problems of diet, so that we now know the essential facts about all the more important of what are called the accessory food factors—the vitamins and mineral salts—which are necessary for health, proper growth, and resistance to disease . . . It is safe to say that a benevolent dictator could double the level of general health merely by applying what is now known about diet." It is true that we can recognize and treat, though we cannot always explain, pronounced vitamin deficiencies. But what is actually known and proven about diet and disease does not as yet justify such uncritical enthusiasm as that of Mr. Huxley.

S. W. Clausen[1] considers that work in this field is still in its infancy, though much of it is suggestive and merits further study. He finds the task of reviewing it far from easy, for, in many cases, the results are contradictory, and in others difficult of interpretation because of many variable factors. He confines himself to infections of bacterial origin, omitting, for lack of space, much excellent and suggestive work on infections of protozoan and metazoan origin.

His analysis of animal experiments indicates that outspoken deficiencies may lower resistance to infection, but that increased feeding of various vitamins to the normal animal may not increase resistance. Evidence for the belief that absence of the vitamin *B* complex lowers resistance is very unsatisfactory. One worker, for instance, claimed that pigeons fed on polished rice lost their immunity to anthrax before symptoms of polyneuritis developed, but another showed that this might in part be ascribed to under-feeding. No attention was paid to the temperature of the animal, although Pasteur had clearly shown that chilling diminished the natural resistance of chickens to anthrax. Similar defects invalidate much of the work of those who believe that vitamin *B* may increase resistance. Taken as a whole the results of work in this field are conflicting. It has even been shown that rats suffering from deficiency of the vitamin *B* complex and infected with *Trypanosoma equiperdum* live longer than infected controls. It appears that in this type of animal experiment, the factor of body temperature must be controlled and the possibility of inanition or at least lessened food consumption taken into account.

Of more significance is experimental work on vitamin *C* deficiency in guinea-pigs, which shows clearly that in this animal scurvy lowers the resistance to certain types of infection.

In regard to vitamin *D*, the supposed lack of resistance to infection in rhachitic infants has led to many studies in animals, chiefly rats and mice. Clausen describes three groups of experiments in detail to point out the fallacies that characterize much of the work in this field. In the first of these, half of the rhachitic animals had already died when infection was induced, so that presumably many of the survivers were moribund, and there were no

[1] *Physiological Reviews*, July, 1934.

uninfected controls. In a second group of experiments it was evident that much of the mortality could be ascribed to the fact that the animals were in a generally weakened state. At present the most one can say is that it seems likely that, in certain species, rhachitic animals are more susceptible than normal animals to certain types of infection; but this may be due to general weakness in the animals and may have little to do with lack of vitamin *D*. On the other hand, rhachitic rats have been shown to have quite normal resistance to certain infections. Numerous attempts to increase resistance in non-rhachitic animals by vitamin *D* or by ultra-violet irradiation provide no evidence for the theory that the resistance of non-rhachitic animals can be increased by anti-rhachitic agents, nor is there any very striking evidence for the general belief that lack of vitamin *D* predisposes to infection.

An elaborate review of the work on vitamin *A* in animals leads Clausen to conclude that complete deficiency in this vitamin leads to loss of resistance to certain infections, while a partial deficiency in early life may lower resistance. "At present, however", he writes, "it is hardly justifiable to term vitamin *A* the specific 'anti-infective vitamin' as Green and Mellanby have done, since a deficiency of vitamins other than vitamin *A* has been shown to lower to some extent the resistance of animals to infection, while factors such as temperature and starvation also play a part."

It is interesting to ask just how and where the changes in resistance to infection occur. Most writers agree that both the normal anti-bodies of the serum and the power to form anti-bodies are not affected by dietary deficiencies. In regard to the resistance of the tissues themselves, the only well established fact is the weakened resistance to infection of abnormal mucous membranes following vitamin *A* deficiency. Further studies in this field may help to link up dietary deficiencies and resistance to infection. It would seem profitable to study tissue reactions to bacteria in animals suffering from dietary deficiency and in such studies to include not only epithelial tissues, but those of the reticulo-endothelial system.

A special section of this review is devoted to the effect of diet on tuberculosis in laboratory animals. The chief difficulty that besets workers in this field in that chronic tuberculosis as seen in man has rarely, if ever, been produced in animals. It is, however, beyond question that scurvy lowers the resistance of guinea-pigs to tuberculosis and that deficiency of vitamin *A* may lower the resistance of the rat and the mouse. It has not yet been shown that rickets lowers the resistance of animals to tuberculosis or that intensive treatment with vitamin *D* is beneficial. So much for the mouse, the rat, the guinea-pig, and the pigeon.

How much of this animal work is of practical application in preventing infection in human beings? Even among animals the results obtained with one species do not necessarily apply to another species. Very few studies have been made in animals receiving a diet only partially defective, yet partial deficiency is far more likely to occur in man than total deficiency, and multiple partial deficiencies have not been adequately studied in animals at all. Within the last sixty years the death rate from infectious diarrhœa in the first year of life has been greatly decreased by the use of uncontaminated milk, but the incidence and severity of respiratory infections have decreased much less. There is a widespread belief that proper diet should bring about such a decrease. Many clinical reports indicate that faulty methods of feeding produce in the infant no greater susceptibility to infection. It has been shown, however, that they do unquestionably lead to a decreased resistance after the infection has already occurred. The effect of faulty nutrition, especially of long continued feeding of diets low in total energy value, may last a considerable time. No studies have appeared which would indicate that infants consuming diets low in the vitamin *B* complex are liable to infection. The rhachitic infant is stated to be unusually susceptible to respiratory infection, but no proof exists for this belief. It is, however, certain that pronounced rhachitic deformities of the chest may aggravate pneumonia in a rhachitic infant. It is clear that infection may be frequent and severe in scurvy or in the "prescorbutic state", but it is not yet proven that in infants fed on a normal diet, increase of vitamin *C* will prevent severe infection.

Observations on human beings, as on animals, fail to provide adequate evidence for giving vitamin *A* the honourable title of anti-infective vitamin. Bloch, who during the war had an unparalleled opportunity for observing xerophthalmia, was impressed with the frequency of severe infections in infants suffering from this condition. This, however, is not recorded by all authors. The most one can say is that feeding in the first few months of life may be of importance in affecting the course of infection in later life.

Attempts to decrease susceptibility to infection and to increase resistance by dietary measures in older persons have included the modification of the mineral content of the food and the use of vitamins. In both respects the evidence is incomplete, and the existence of relative deficiency of vitamin *A* in older persons remains to be established. There is a certain amount of evidence that diets deficient in vitamin *A* may predispose to tuberculosis in man or may aggravate its course. Probably there is an optimal intake of this vitamin, and this optimal intake is provided by diets now in use, but there is no evidence at present that increasing the intake beyond the optimal amount is in any way necessary. Experimental work by McConkey and Stuhr-Christensen indicate that vitamin *C* is of great importance in tuberculosis, but there is no definite proof of this. Clausen concludes that susceptibility to infection is not affected by diet though resistance to infection may be greatly reduced by deficient diet. His review contains much destructive criticism, but ends with a plea for further research.

Abstracts from Current Medical Literature.

MORBID ANATOMY.

Lymphangio-Endothelioma of the Heart Causing Complete Heart Block

C. BRUCE PERRY AND HERBERT ROGERS (*The Journal of Pathology and Bacteriology*, September, 1934) report the occurrence of a lymphangio-endothelioma of the heart that gave rise to complete heart block. They point out that primary tumours of the heart traceable to vaso-formative tissues are very rare. The patient was a woman, aged twenty-six years, who, between the ages of four and twelve, had suffered from fainting attacks. Later she remained in comparatively good health until she was twenty-six years of age. She then became subject to attacks of unconsciousness. The electrocardiogram revealed complete heart block. During one of the seizures she died. Naked eye examination of the heart at autopsy failed to reveal any form of tumour, gumma or congenital abnormality. On histological examination the sino-auricular node area and the anterior portion of the interventricular septum were normal. Neoplastic tissue occupied the interauricular portion of the posterior part of the septum. Close naked eye examination revealed a honeycombed appearance due to the presence of a tumour. The cells had a somewhat irregular or oval outline with vesicular nuclei; in most cases there were no nucleoli. In spite of certain suggestive appearances, it was decided that the tumour was not a secondary carcinomatous deposit. Transition from cord-like masses through thick-walled canals to capillary-like structures could be clearly traced. No connexion with blood vessels was observed and none of the lumina contained red blood corpuscles. By the serial section method the gradual approach of the tumour to the auriculo-ventricular bundle, its entry at the superior angle of the bundle, and the final complete involvement of the conductive tissue were easily observed.

Polyarteritis Nodosa Resulting in Gangrene.

W. G. BARNARD AND W. M. BURBURY (*The Journal of Pathology and Bacteriology*, September, 1934) report the occurrence of gangrene of the fingers and toes in a case of *polyarteritis nodosa*. The patient was a child, eight years of age. The clinical picture was that of an acute infection and the first diagnosis was primary purpura. The correct diagnosis was made in the *post mortem* room. The changes in the arteries were all of the same type, but the extent and severity of the lesions varied in different parts of the body. The changes ranged from necrosis of patches of hypertrophied intima to necrosis of the greater part of the wall of an artery and from slight inflammatory infiltration to an inflammatory lesion of great severity. The cells taking part in the inflammation were mostly neutrophile leucocytes and lymphocytes, but in a few areas there were also plasma cells, eosinophile cells, histiocytes, endothelial cells and fibroblasts. The authors have been unable to find in the literature a report in which gangrene of the extremities was the chief clinical feature. They refer to the view that the condition is due to an infection, and they point out that because the fullest bacteriological examinations have been fruitless and also because knowledge of virus diseases and allergic reactions has increased, the tendency has been to attribute the lesions to one or other of these agencies. They add that from the morbid anatomical and histological point of view it is important to stress that the inflammatory reaction, cellular infiltration and leucocytosis may be secondary to necrosis of vessel walls, and do not of themselves constitute proof of an infective agent of the bacterial type.

Chondroma of the Lung.

N. E. GOLDSWORTHY (*The Journal of Pathology and Bacteriology*, September, 1934), in reporting a case of chondroma of the lung, refers to the contention of Albrecht that there exists a group of tumour-like formations whose true characteristics and relations justify their separation from the true neoplasms. To accommodate them he created two classes, hamartomata and choristomata. The term hamartoma denotes tumour-like hypertrophy at the site of a faulty tissue mingling; the term choristoma denotes similar hypertrophy in a displaced tissue germ or organ germ. The author is concerned with hamartomata. He points out that the term hamartoma is a wide one and includes such diverse formations as hæmangioma of the liver and spleen and certain chondromata of the lung. The tumour described by the author was ovoid and measured approximately four by three centimetres. The chief feature of the tumour was its cartilaginous nature. Its connexion with the surrounding lung was a delicate one. The ill-defined capsule was incomplete; in places the cartilaginous masses seemed to abut almost directly on lung alveoli. The lung tissue immediately surrounding the tumour was normal, except for some collapse of the alveoli due to pressure. The masses of cartilage composing the tumour were of varying sizes, more or less rounded and arranged in close-set order. Within the intervening connective tissue were spaces lined by epithelium that was often columnar, and this columnar epithelium was often provided with well-developed cilia. The author describes the other histological features of the non-cartilaginous part of the tumour. He discusses the significance of the several components of the tumour and states that the classification of tumours of this kind is still a matter of dispute. He refers particularly to two views. Virchow would have regarded these tumours as taking origin from the normal bronchial cartilage. The author refers in turn to the views of Ribbert, Nicholson and Casper in their bearing on Virchow's conception. He thinks that those who regard the tumours as teratoid have some justification for their attitude, and that their contention must be seriously considered. He adds, however, that if the validity of Albrecht's views are admitted, tumours such as those described by him are to be regarded as hamartomata.

Injury and Tumours of the Gonads.

R. A. WILLIS (*The British Journal of Experimental Pathology*, August, 1934) has made an experimental study of the possible influence of injury in the genesis of tumours of the gonads. He refers to the widely held view that trauma has an influence in this regard. Dew found that there was a definite history of trauma in anything up to 50% of these tumours; while he admitted that proof was lacking, he thought that an essential connexion was strongly suggested. The author carried out investigations on 107 rats (82 males and 25 females). The testes and ovaries were subjected to a great variety of traumatic and chemical injuries, and the animals were kept for periods ranging from 25 to 35 weeks thereafter. The changes observed in the damaged organs were those of necrosis and its sequelæ; no tumours appeared. While he admits that his series of animals is small, the author thinks that the results at least strengthen the suspicion that injury and inflammatory processes play no more than a coincidental part in the histories of patients with testicular or ovarian tumours.

Bile Peritonitis.

STANLEY H. MENTZER (*Archives of Surgery*, August, 1934) discusses the question of bile peritonitis. He points out that it has been impossible to correlate laboratory findings and clinical experience. It has been shown by many laboratory workers that death of an animal occurs when large quantities of sterile bile are poured continuously into its peritoneal cavity. Diffuse sterile bile peritonitis has rarely, if ever, been found as a cause of death in man. Extravasated sterile bile in the human subject is rapidly encysted and then becomes relatively innocuous. Should the bile not become encysted, it produces ascites, which calls for surgical operation. When infected bile is spread over the peritoneal cavity death results unless prompt surgical measures are undertaken. In these circumstances death is due to pyogenic rather than to

chemical peritonitis. As an explanation of these differences the author shows that dog's bile contains eight times as much taurocholic acid as glycocholic acid, while human bile contains only one-fifth to one-eighth as much. Taurocholic acid is from twelve to twenty times as toxic as glycocholic acid. Therefore bile peritonitis in a dog is at least forty times as dangerous as a proportionate amount of bile peritonitis in man. In rabbits and guinea-pigs a similar, though less pronounced, disparity is found.

MORPHOLOGY.

The Suprarenal Cortex in Monkeys.

W. OSMAN HILL (*Journal of Anatomy*, October, 1933) makes a further contribution to his work on the comparative anatomy of the suprarenal cortex. The greater part of the suprarenal gland during fœtal life and during the first few months succeeding birth consists of "fœtal cortex". This is enclosed in a thin rim of "true cortex", whilst in the middle of the gland the medulla is represented by a few scattered islets of chromaffin tissue only. This is much the same as is found in man. The main changes which take place after birth occur in the "fœtal cortex". Soon after birth the "fœtal cortex" is replaced by a well developed *zona fasciculata* and *zona reticularis*. The "true cortex" of fœtal life becomes greatly developed and gives rise to the *zona arcuata* or *glomerulosa* and the greater part of the *zona fasciculata*. The *zona reticularis* and probably some of the *zona fasciculata* are derived from the "fœtal cortex". The *zona fasciculata* diminishes in depth with adult life, especially in the male. In the female it remains larger and undergoes hypertrophy during pregnancy. The *zona reticularis* becomes condensed in later childhood and before adult life it disappears in both sexes.

The Optics of the Insect Eye.

C. J. VAN DER HORST (*Acta Zoologica*, Number 1, 1933) states that in the animal kingdom two totally different types of eyes occur that are able to form a distinct image, namely, the compound eye in insects and crustacea and the lens eye in vertebrates and cephalopoda. Undoubtedly the lens eye functions more accurately and is a more perfect optical instrument than the compound eye. But in animals of the dimensions of an insect, a lens eye would be useless for the formation of a distinct image. A lens eye cannot go below a certain minimum size, consequently the smaller cephalopoda have relatively very large eyes. If an insect had an eye of the vertebrate type, the pupil would be so small that the diffraction of the light would make the formation of a clear image impossible. The only other possibility for the formation of a distinct image is the union of a large number of small and optically isolated single eyes (called ommatidia in insects) into a compound eye. Though the ommatidia are very small, they are very large compared with the retinal elements of the vertebrate eye. A rod of the length of a metre will be seen by the dragonfly by 60 ommatidia at a distance of 1·37 metres from the eye; in the same circumferences over 2,000 retinal elements will be stimulated in the eye of man. Thus an object observed by an insect eye will resemble a coarse net figure in a newspaper. Yet this figure is very distinct and clear compared with the images that can be formed by the eyes in other groups of animals. Another point discussed is the fact that the amount of light reaching the whole compound eye and contributing to the formation of the image will not change with increasing or decreasing object distance, provided that the object distance does not exceed a certain maximum. A fly will not get more light in its eye when it is walking over the surface of an electric bulb than when it is at a distance of one metre from the bulb.

Embryonic History of the Germ Cells.

HUBERT W. BLOCKER (*Acta Zoologica*, Number 1, 1933) discusses the origin and early history of the germ cells in vertebrates and traces their history in the English sparrow. He finds that the primordial germ cells in the sparrow are of extraembryonic origin and are first seen in an embryo of one or two somites in a crescent shaped area at the outer margin of the proamnion. They are found in the entoderm and in the space between the ectoderm and the entoderm. They remain in this position up to the seven or eight somite stage, during which time they take on more definite germ cell characteristics. After the arrival of the mesoderm the germ cells enter the blood vessels of the vascular area, in part passively, during the formation of the blood islands, and in part actively, by forcing their way through the entoderm lining these vessels. In the ten somite embryo all stages in the process of this migration can be observed. The germ cells are carried through the circulation with the blood cells and at about the twenty-five somite stage make their appearance in the small vessels of the splanchnopleure, where they leave these vessels and begin their migration toward the site of the future gonad, where some of the germ cells take their place among the cells of the so-called germinal epithelium. The lodging of the germ cells in the vessels of the splanchnopleure is attributed entirely to mechanical factors and is dependent upon the size and shape of the vessels in the region. The progress of migration of the germ cells from the vessels of the splanchnopleure continues to about the thirty-six somite stage, when practically all of the germ cells have left the blood vessels. A small number of the germ cells become lodged in small vessels of distinct regions and probably never reach the gonads. There is a shifting of the germinal epithelium with its contained germ cells from the splanchnopleure, through the cœlomic angle, to the somatopleure during the stages from three to four days' incubation. During the formation of the gonads and during sex differentiation germ cells are found in all parts of the gonads. The first mitoses of germ cells were observed in a four and a half day embryo. Histologically, sex cannot be distinguished before the eighth day of incubation, when the cortex begins to form beneath the epithelium of the left ovary. The primordial germ cells are not replaced by a second generation of germ cells, but they give rise directly to the definitive sex elements. Their number is increased only by mitosis and no germ cells are derived from somatic sources.

Efferent Fibres in Posterior Spinal Nerves.

SIDNEY KAHR AND D. SHEEHAN (*Brain*, September, 1933) sectioned posterior roots from the twelfth thoracic to the second lumbar between the cord and spinal ganglion. By the Bielschowsky and Weigert methods he was able to demonstrate intact fibres in the central ends of the severed posterior roots. These fibres were seen entering the cord and were studied intraspinally. Wallerian degeneration was observed in the distal ends of the cut posterior root. This degeneration could also be observed in the nerve peripheral to the spinal ganglion. The observations are all in support of the existence of efferent fibres in the posterior roots examined. Nissl studies of the spinal cord revealed changes in the intermedio-mesial group of cells and in the anterior horn cells. The localization of the trophic centre for such efferent fibres is rendered impossible by the presence of cellular changes apparently occurring transneuronally.

The Retractor Muscle of the Eye.

O. C. BRADLEY (*Journal of Anatomy*, October, 1933) gives an account of the retractor muscle of the eyeball in carnivora and ungulata. In the majority of carnivora the retractor muscle of the eyeball is divided into four parts, which alternate in position with the recti and are attached to the sclera behind the insertion of these muscles. This is in accordance with the current descriptions as applied to the dog and cat. In ungulata there is an irregularly (and frequently interrupted) circular attachment of the main mass of the muscle close to the equator of the eyeball, and a variable number of bundles of fibres of varying size inserted nearer the optic nerve. In ungulata the pattern of insertion of the retractor is not necessarily the same in different members of the same species nor the same in the two eyes of the same individual.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE SOUTH AUSTRALIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the anatomy lecture theatre, University of Adelaide, on July 26, 1934, DR. L. C. LINDON, the President, in the chair.

Spinal Anæsthesia.

DR. GILBERT BROWN read a paper entitled: "Spinal Anæsthesia" (see page 629).

Dr. Brown read a letter from Sir Henry Newland, who had been prevented by illness from attending the meeting. Sir Henry Newland's letter was as follows:

Lee Lodge,
Strangways Terrace West,
North Adelaide,
July 25th, 1934.

Dear Brown,

I first saw spinal anæsthesia used in October, 1901, in the surgical clinic of the German Hospital in Prague, Bohemia.

The patient was a medical student who was about to have his appendix removed. Stark naked, he sat on the operating table with his legs dangling over one side. The spinal needle was introduced without difficulty, whereupon the patient promptly had a syncopal attack. I am not sure whether it was due to fright or to the little operation itself. The appendix was removed without further ado.

During 1900, the year prior to my visit to Prague, I had become familiar with the operation of lumbar puncture, as there was at that time an epidemic of posterior basal meningitis in the East End of London. Many cases were admitted under the care of Sir Stephen Mackenzie and Dr. Schorstein, whose house physician I was.

In January, 1902, I visited Paris and there purchased a good supply of ampoules of "Stovaine Billon".

In March I returned to Adelaide to join the late Dr. Marten in practice, and in the course of 1902 I used spinal anæsthesia for three operations—an appendicectomy, an internal urethrotomy, and removal of hæmorrhoids. There were no untoward happenings, but I did not persist in the use of the method lest there might be some in the future.

That was over thirty years ago. Research in the interval has brought the procedure within the realm of safety, but, as with all anæsthetics, the price of safety is eternal vigilance.

Yours sincerely,
H. S. NEWLAND.

DR. A. F. HOBBS congratulated Dr. Gilbert Brown on his valuable paper. He had to thank Dr. Brown for his introduction to the Howard Jones technique of spinal anæsthesia. He had found this method very satisfactory. He emphasized the advantages of "Percaine" over previously used drugs, especially in regard to the duration of analgesia. In the prevention of post-operative headache he considered it was desirable to keep the head low for a longer period than the eight hours advocated by Dr. Brown. It was rare to encounter severe headache after "Percaine". With the use of "Percaine", in spite of the fact that the fall in the blood pressure was often extensive, this very seldom gave rise to serious symptoms. With a similar fall in pressure such symptoms seemed to arise much less frequently than after "Stovaine".

Very occasionally failure to obtain satisfactory analgesia occurred when a satisfactory puncture had been performed. No satisfactory explanation of this had been given. There was considerable variation in the height of analgesia resulting from the injection of a given quantity of solution, for example, 11·5 cubic centimetres of 1 in 1,500 "Percaine" solution given for a lower abdominal operation sometimes resulted in analgesia to the level of the nipples.

Dr. Hobbs had fairly frequently encountered a moderate amount of vomiting after operation, but factors other than the anæsthetic agent were frequently concerned.

Dr. Hobbs mentioned the method described by Silverton, in which a 1 in 200 solution of "Percaine" in 6% glucose was used. He had used this method only for the production of sacral and lumbo-sacral analgesia. This method was harmless when used for this purpose, there being no fall of blood pressure. The technique was simple, and he advocated the use of this method especially for operations on the anal canal, perineum, and for intraurethral manipulations. The extent of the analgesia was remarkably constant.

Spinal anæsthesia was of great value in operations for acute intestinal obstruction. In this condition the mortality had been greatly reduced as a result of the use of this form of anæsthesia. The reduction was mainly due to the avoidance of danger from vomiting during induction of inhalation anæsthesia and to the lessening of the difficulty of the operation resulting from the relaxed abdominal wall and the diminution of intestinal distension.

Among contraindications to its use were cases of gastro-intestinal perforation and acute infective processes in the peritoneal cavity, as infection might be spread by stimulating peristalsis. Dr. Hobbs asked Dr. Brown whether he agreed with the statement which had been made, that the presence of an acute infective process in any part of the body should constitute a contraindication to the use of spinal anæsthesia, and whether he could assign a reason for this.

Dr. Hobbs referred to the therapeutic use of spinal anæsthesia in cases of paralytic ileus. It was effective in reducing distension and allowing the passage of flatus, but he had no personal case in which ultimate recovery from post-operative ileus had resulted from its use.

DR. J. W. CLOSE asked whether Pitkin had not been given too much credit at the meeting for the introduction of ephedrin as a regulator of the blood pressure. At least in the early twenties adrenaline had been used intravenously for the same purpose, and ephedrin started to displace it almost as soon as it was introduced as a substitute for adrenaline in other ways. Dr. Close believed that the greatest benefit of spinal anæsthesia in bladder surgery was the ability to take fluids immediately before, during and immediately after the operation. He asked Dr. Brown what was the safe limit of dosage of ephedrin when repeatedly administered during the operation. Referring to the after-headache, he missed any reference by Dr. Brown to the virtue of pituitrin. The venereologists at the annual meeting of the British Medical Association a few years ago had seemed generally to rely on pituitrin for the headache following lumbar puncture for any purpose, and as far as Dr. Close could see, quite empirically. The cause of this lumbar puncture headache seemed to be as uncertain as the methods of combating it; the fact that sulphate of magnesia administered rectally relieved it, no doubt by removing fluid from the brain, made it difficult to understand why leakage through a large puncture hole should have the opposite effect. Dr. Close added his thanks for Dr. Brown's instructive paper.

DR. E. COUPER BLACK said that Dr. Gilbert Brown had given them a good exposition of the modern technique of spinal anæsthesia. Dr. Black's experience had not been large, but he had been impressed with the value of ephedrin. No doubt the death rate in the past had been high, often through bad selection of cases, such as desperately ill patients. Only a sound heart could stand the reduced coronary circulation brought about by a big fall in blood pressure, which also meant a reduced blood flow in the lung capillaries, with anoxæmia affecting all tissues of the body. Howard Jones's outlook was: "This man is too strong for a general; better give him a spinal." A slowing of the pulse rate had been observed to precede failure of respiration in experimental spinal anæsthesia. Dr. Black was interested to know whether this had been observed with patients showing a big fall of blood pressure.

DR. DAWKINS asked Dr. Gilbert Brown his opinion of spinal zone anæsthesia.

DR. G. H. BURNELL asked Dr. Gilbert Brown his opinion of when to use ephedrin in connexion with spinal anæsthesia.

DR. L. C. LINDON asked Dr. Gilbert Brown what percentage of failures occurred with "Percaine" spinal anæsthesia.

Dr. Gilbert Brown thanked the members for their kindly reception of his paper. In reply to Dr. Hobbs he said that it was a curious fact that even when the blood pressure fell considerably under "Percaine" the patient looked better and felt better than did those with a similar degree of depression under "Stovaine" or "Novocain". This was probably accounted for by the smaller amount of the drug absorbed into the blood stream. The reason for the short period in the Trendelenburg position after operation was an attempt to simplify the after-treatment as much as possible. Although there had been no untoward symptoms attributable to this method, it might be interesting to compare groups of cases to see whether a longer period was followed by fewer complications. Perforation of a hollow viscus was usually considered a contraindication to spinal anæsthesia, as the movements of the intestine might convert a local into a generalized peritonitis. Dr. Gilbert Brown had not used the heavy solution of "Percaine", as he preferred to concentrate on one technique until it had been given a thorough trial. Possibly the heavy solution was even better than the light solution for operations on the extremities and perineum.

In reply to Dr. Dawkins, Dr. Gilbert Brown said that he had read in the "Medical Annual" an account of the spinal zone anæsthesia as used by Kirschner, of Tübingen, but the special syringe was not available in Australia.

In reply to Dr. Black, he said that one of the objections to "Spinocain" was that the usual dosage contained 200 milligrammes of "Novocain" and occasionally 300 milligrammes were used. This was a very large dose from the point of view of toxicity, especially as seven or eight milligrammes of "Percaine" would produce an analgesia which was equally good and of longer duration.

In reply to Dr. Burnell, Dr. Gilbert Brown said that he had followed the method of Howard Jones in using one large dose of ephedrin before lumbar puncture, as it saved the patient from repeated injections. He was now trying a method by which half the dose was given before spinal puncture and the other half was injected immediately before the operation began. This method had not been used sufficiently to compare the results.

In reply to Dr. Close, Dr. Gilbert Brown said that adrenaline did control circulatory depression, but was more evanescent than ephedrin. Dr. Gilbert Brown was unable to say what was the safe maximum dose of ephedrin; he had used up to three grains. The danger in large dosage was that the sum of the natural improvement in the circulation and that caused by ephedrin might continue until the blood pressure was even higher than that before operation. He considered that spinal headache was a meningismus caused by trauma rather than by leakage of cerebro-spinal fluid. This was borne out by the fact that the very severe headaches were often relieved by rectal injection of magnesium sulphate or by lumbar puncture. He had heard from friends in London that ephedrin was also a successful treatment; he had no experience of the use of pituitary extract for the purpose.

In reply to Dr. Lindon, Dr. Gilbert Brown said that he thought that the failures to obtain spinal anæsthesia with "Percaine" were very few; there were none in the last fifty cases that had been analysed.

A MEETING OF THE VICTORIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION, IN CONJUNCTION WITH THE NEWLY FORMED SECTION OF UROLOGY, was held at the Medical Society Hall, East Melbourne, on June 6, 1934, DR. GERALD WEIGALL, the President, in the chair.

Some Problems in Urology.

DR. JULIAN SMITH read a paper entitled: "Some Problems in Urology" (see page 634).

DR. J. THOMSON TAIT, in introducing the discussion, said that he wished to express, on behalf of the newly formed Section of Urology, their grateful appreciation and thanks to Dr. Julian Smith for coming to deliver the address at their inaugural meeting.

Dr. Smith had given an indication of the wide nature of the various problems with which the urologist was called upon to deal, and had explained how he had come to limit his remarks to those of one operation in particular, that of prostatectomy. Before the meeting he had also expressed a desire that his remarks be regarded as controversial, and the hope was therefore that the subsequent discussion would be as wide and free as possible.

Two aspects seemed worthy of mention by Dr. Tait. One was that the successful treatment of a patient with prostatic trouble commenced with his general medical practitioner and it did not so much matter what type of operation was performed, as it was the constant care and attention of all concerned that brought about a complete cure. He would like to emphasize the fact that the results of prostatectomy in these cases were excellent from the point of view of the patient. So many cured patients express themselves as "feeling ten years younger" after a successful prostatectomy.

A second point was the necessity during the enucleation of the prostate of taking care that all of the gland was removed. Dr. Tait had met with several patients for whom a partial removal had been done and a further prostatectomy had to be carried out.

DR. W. A. HAILES said that his interest in the subject of prostatectomy dated back to his early days at the Melbourne Hospital. With the late Dr. F. H. Langlands he had examined the records of a series of cases of this operation up to the time of the Australasian Medical Congress in 1923. The mortality of this series had been high and many of the deaths had been due to sepsis. It appeared that attempts to control hæmorrhage by packing and pressure increased the incidence of sepsis with pelvic cellulitis, secondary hæmorrhage and pyelonephritis resulting.

Dr. Hailes said that he had been much attracted by the work of Dr. Harry Harris, of Sydney. So far as Dr. Harris's technique was concerned he had had two difficulties. The first was an inability to manage, in the pre-operative stage, a percentage of cases with an indwelling catheter. It had been his experience that in some cases cystitis was not improved and the general condition deteriorated. In these circumstances, at the first indication that all was not well, he opened and drained the bladder. So far as he personally was concerned, all cases of retention could not be managed with an indwelling catheter, and he affirmed that, if satisfactory progress was not being made, to persist with the indwelling catheter was to invite disaster; suprapubic drainage was essential then.

Secondly, in attempting the Harris technique after suprapubic drainage he had had difficulty, not with the suturing of the prostatic bed, but with closure of the bladder. He had operated on twenty-five cases using the Harris technique, with one death. In only one case in the twenty-five, and they included the first and last cases operated on, had hæmostasis not been efficient. In that case the hæmorrhage was only enough to block the catheter and not to endanger life. To him Dr. Harris's method insured hæmostasis adequately without a foreign body being left in the bladder, and the experience quoted above in a first series emphasized that the method of hæmostasis was efficient. Referring to the criticism of the immediate closure of the bladder in the Harris method, it should be pointed out that Dr. Harris insisted before closure that there must be a clean bladder and effective hæmostasis; in the absence of these Harris did not dream of closing a bladder.

Dr. Hailes's experience to date was that convalescence was as a rule much shortened and that the patients in the

convalescent period were better generally and had less evidence of toxæmia and sepsis than with other methods. Personally his post-operative worries had been less. Suprapubic sinuses through the track of silkworm gut retaining suture had been a source of annoyance in a few cases, but had always closed spontaneously. Continuing, Dr. Hailes said that he considered that Dr. Harris had done more than anyone else in this generation to improve the operation of suprapubic prostatectomy.

DR. JOHN KENNEDY congratulated Dr. Julian Smith on introducing the subject of prostatectomy. He drew attention to the fact that Freyer in 1911 was able to present one thousand cases of prostatectomy with a mortality of 5%; that he was very careful in selecting his cases for operation. Dr. Kennedy said that from his own knowledge gained as house surgeon no patient was sent to operation by Freyer with a urea concentration lower than 1·5%. He was of the opinion that sufficient attention had not been given in many cases to pre-operative treatment, and that one failed often to realize the length of time that a prostate with a distended bladder and latent uræmia required to become operable, even if the bladder was properly decompressed. He said that this was brought home to him very forcibly at the latter end of last year, when a man who, though working, came up for treatment with the bladder to the umbilicus, headaches, a systolic blood pressure of 190 millimetres of mercury, and blood urea of 100 milligrammes *per centum*. This patient's bladder was decompressed and he was sent home in a fortnight, but it was three months before his blood urea content had fallen below 50 and he was considered a fair risk for prostatectomy. The man left the hospital a fortnight after his prostate had been removed and resumed his work.

Dr. Kennedy strongly supported Dr. Julian Smith in the use of the Pilcher's bag and in its value in this operation. His house surgeon perhaps put the matter as forcibly as it could be put when discussing this matter recently. During his period of three months eight cases of prostatectomy had passed through his hands, and he said, when Dr. Kennedy wished to discard the bag and do the case by suture method: "Please don't, sir. We haven't lost a case when you put the bag in, and one can go to bed and get to sleep and not be up half the night washing the bladder out and giving transfusions." Dr. Kennedy said that he first saw the Pilcher bag used in the Mayo Clinic in 1925, and the simplicity of the method, the small amount of blood lost, the safety and control of the patient appealed to him. He saw these cases operated on in Baltimore and London, but nothing that appealed to him as so safe for the patient as the method he had seen at the Mayo Clinic, and he brought back with him from Paris a supply of Pilcher's bags and used them in his private work. In his experience patients did not suffer considerable pain, and he was of the opinion that the surgeons who had had that experience were not applying the bag in the proper manner. The bag was not placed in the prostate cavity, but was placed in the bladder and, when distended, should be large enough to prevent its being drawn through the opening in the bladder into the cavity. If it was properly applied and the traction was made on the thread and not on the rubber tubing, very little tension served to draw the floor of the bladder down and obliterate the prostatic cavity and prevent hæmorrhage. If the bag was inserted in the cavity and the traction was made on it, the only result that could occur was to drag the bag into the membranous urethra and give rise to severe pain.

Dr. Kennedy said that he had seen Dr. Harris do his operation and that he had sutured the bladder in the same method; he had nothing but praise for the operation, which was an ideal proceeding, but it was time-consuming and difficult as a second stage operation.

DR. ALAN NEWTON said that Dr. Julian Smith had the faculty of making even dull subjects interesting, and when he chose an interesting subject he made it doubly so. In performing prostatectomy, Dr. Newton's routine until recently had been the two-stage operation: first, with a suprapubic drainage with a de Pezzer catheter; the second, a rapid enucleation under ethylene anæsthesia and using a gauze pack for hæmostasis. The mortality had been low, but hæmorrhage was not uncommon on removing the gauze pack. Sepsis also was not uncommon, and with this method the stay in hospital was sometimes long. He had tried the rubber bag recommended by Dr. Smith, but in his (Dr. Newton's) hands it had proved a painful instrument from the patient's point of view and he had abandoned its use. More recently he had adopted Dr. Harry Harris's method and had been astonished at the ease and rapidity with which stitches could be introduced with his ingenious instruments, and he proposed to follow this method in future.

DR. H. B. DEVINE said that he had enjoyed the lecture immensely. The subject, the surgical treatment of the enlarged prostate, had been a fitting one for Dr. Julian Smith's rapier-like intellect. Discussion of such a difficult subject as this was of great benefit, because of the expressions of opinion and the confessions of failure. Dr. Devine felt that there should be no fixed rule or rigid method to be applied to every case. Each patient should be treated in an individual way according to the circumstances of the case. He felt obliged to change his methods to a certain extent in almost every operation he performed. In the broad sense, however, the secret of the success of the modern operation of prostatectomy could be attributed to the improved methods of operation advocated by Dr. Harry Harris, of Sydney. The main principle of these methods was complete hæmostasis carried out by suture of the prostatic cavity. In favourable circumstances—satisfactory hæmostasis *et cetera*—Dr. Harris also advocated immediate closure of the bladder. Dr. Devine said that he himself rarely carried out immediate closure of the bladder. He felt that he should not like to teach this latter principle to post-graduates, because the principles which should govern the application and technique of this might not be always accurately followed and might, therefore, lead to a number of deaths. He thought that the average surgeon, after carrying out Harris's method of suture of the prostatic cavity, should be content with an open bladder and suprapubic drainage.

Dr. Devine usually employed presacral anæsthesia, using 0·5% "Novocain" and injecting this into each side of the hollow of the sacrum. He used regional local anæsthesia for the abdominal wall. Anæsthesia lasted from two to four hours. There was no shock and no pain, and it was possible to obtain a good exposure of the base of the bladder and the prostatic cavity. This mode of anæsthesia gave plenty of time, quietness and relaxation, and facilitated the meticulous insertion of sutures for hæmostasis and partial obliteration of the prostatic cavity. In the after-treatment he used continuous suction through a small aspirating tube, the perforated knob of which was placed a quarter of an inch from the base of the bladder. In this way the irritating effects of decomposing urine were removed from the prostatic wound and the space of Retzius was kept dry. Generally the abdominal wound was ready to close by the time the prostatic cavity was healed. If the abdominal wound did not close readily, he closed it by a few sutures under local anæsthesia.

Dr. Devine went on to say that while, of course, good mortality statistics were desirable, they should not unduly govern the surgeon's outlook. Prostatic enlargement had as a rule an innocent cause and, no matter how bad the patient was, he should be given the benefit of operation. He had in most unfavourable cases, which had been most refractory to prolonged pre-operative treatment, seen patients stand a carefully planned operative interference and ultimately get comparatively well. Operations in these unfavourable cases ruined mortality statistics, but very often gave unexpected successes and on the whole saved lives. In these cases the operative interference should be staged as shortly as possible and hæmostasis should be obtained by packing for a few minutes with some of the new hæmostatic gauze.

DR. J. NEWMAN MORRIS said that 30% of men at some time suffered from enlarged prostate, and of these at least half had troublesome symptoms. The question arose, at what stage these should come to operation. Dr. Julian

Smith had referred to the higher mortality in general hospitals. This was as high as 25%, and the deaths were distributed more or less evenly between all operators and compared very unfavourably with the figures achieved in private practice. There must be some factor other than operative skill, and Dr. Morris suggested that the absence of nurses specially trained in this operation, the over-strained financial position of the hospital tending to hurried discharge of patients, and possibly other factors combined to make this difference in results. This problem was one of those which had called for the formation of the Section of Urology, and Dr. Julian Smith's address made it amply clear that the section had a purpose to fulfil.

DR. W. OSTERMEYER said that he had enjoyed Dr. Smith's address immensely, but he had been disappointed that no reference had been made either by the lecturer or by those who had taken part in the discussion to the causation of enlarged prostate. Dr. Smith had referred to the early operations of vasectomy and castration in the treatment of this condition, but while indicating that they had not been successful therapeutically, he had not mentioned what effect they had had on the psychological or neurological state of the patients. No mention had been made of the after-effects of prostatectomy as far as the sexual function was concerned, and he (Dr. Ostermeyer) would be glad to hear something on these important physiological points.

DR. VICTOR HURLEY said that operative treatment had been referred to, but the selection and preparation of patients for operation was more important for a general discussion than the technical details of the operation itself. First must be considered the type of patient who reported with nocturia possibly two or three times during the night, with difficulty in starting and some difficulty in stopping urination. Many patients did not report for medical advice at this stage, as it was a common and erroneous belief that nocturia was an inevitable ill of increasing years. In such cases a most reliable sign was the amount of residual urine. If it were less than two ounces, no urgency existed, and occasionally it would be found that the condition did not progress further and did not eventually come to operation. They had no certain knowledge regarding the cause of the changes in the prostate in simple enlargement and why they were usually progressive. Possibly it was comparable to the changes in the female organs at the menopause. Patients with early symptoms of this type should be advised to report at intervals of not more than three to six months. If the residual urine did not increase, operation could be deferred so long as the general clinical condition remained good. In cases in which the residual urine was up to four ounces, if the clinical condition were satisfactory, and in the absence of urinary infection, the one-stage operation for prostatectomy should be performed, and with reasonable safety. Patients with a residual urine of four ounces and upwards presented a more difficult problem, and it was in this group and the infected cases that the highest mortality occurred. French writers referred to this condition as incomplete retention. In these cases degenerative renal changes due to back pressure and cardio-vascular changes were usually present, and the safest procedure was some method of urinary tract drainage to improve the renal function before operation. Some patients were intolerant of the inlying urethral catheter, but most preferred this method to two operations. Careful supervision by the surgeon and skilled nursing were needed to avoid infection. Many patients were, however, infected when they first consulted the surgeon, even though their bladders had not been catheterized. Generally speaking, he preferred catheter drainage with scrupulous antiseptic precautions, because it avoided two operations, it was usually well tolerated, and it left the operative field for the subsequent prostatectomy untouched, a matter of some importance if the Harris operation or Thomson Walker open operation was to be performed.

Suprapubic drainage was usually reserved for those patients in whom catheterization was painful or difficult, or where hæmorrhage readily occurred, as well as in those cases in which infection or poor renal function existed.

In doing suprapubic drainage he preferred open drainage through a large tube, but made the suprapubic opening as far away from the pubis as possible. He felt that an opening near the pubis increased the danger of infecting the prevesical space and also made the second stage of the operation more difficult. The standard operation in Melbourne for years had been the Freyer method, with modifications, and in this the bugbear was hæmorrhage. Dr. Hurley said that he had tried most methods described, but in his hands the Pilcher bag had not been as reliable as packing with gauze, and he thought that the bag tended to cause pain and delayed the return of voluntary micturition, probably from the bag being drawn down into the membranous urethra with overstretching of the neck of the bladder. Referring to Thomson Walker's open operation, Dr. Hurley said that this surgeon did not do this operation as a routine measure, especially in stout subjects, in whom the technical difficulties must be great. He considered that Harris's operation, as performed by its originator, was a piece of surgical artistry, but was not suitable for the occasional operator.

DR. MURRAY MORTON thanked Dr. Julian Smith for a most interesting and provocative address. Referring to Dr. Ostermeyer's question, he had read that enlarged prostate was almost unknown in Turkey, where polygamy was practised, but it was not possible to say whether this had any scientific bearing on the point. Referring to urinary infection, Dr. Morton said that he could remember the time when old gentlemen used to carry catheters in their hat bands for daily use, and they seemed to survive even this proceeding for a number of years. When in London in 1926, Dr. Morton said that he had been interested in prostatic surgery. Swift-Joly made a large incision. Another surgeon, Ogier Ward, used a bag not unlike the Pilcher bag, and exerted pressure from above with a metal arm and counter-pressure through the perineum. This required a fairly open suprapubic wound and was probably useful for an occasional case. He considered that a well-fitting suprapubic drainage tube was better than the suction pump used by Dr. Devine. It seemed extravagant to use about 1,200 gallons of water to drain about two pints of urine in twenty-four hours. His practice was to use figure-of-eight silkworm gut sutures and no buried sutures in the bladder wall. By this method one of his patients had passed urine normally and had remained dry after the tenth day.

DR. HENRY MORTENSEN referred to the method of per-urethral prostatic resection by the use of the electrotome and the cutting current. A large proportion of prostatectomies were performed by this method in American clinics, including the Mayo Clinic, and it was being adopted more recently in England. According to Bumpus, in the Mayo Clinic 85% of cases of prostatic obstruction could be dealt with by this method. In malignant disease of the prostate inoperable by the usual method, urethral resection was a valuable method of relieving symptoms. It did away with the suprapubic drainage tube and there was usually little hæmorrhage. This method of prostatic resection was definitely useful in the type of early case described by Dr. Hurley, as there was an appreciable mortality attached to all operations for prostatectomy and the mortality for the resection method was very small. Dr. Mortensen stated that he had performed this operation in several instances and found that it was a procedure presenting great technical difficulty and not to be recommended to the occasional endoscopist.

In concluding the discussion, the President conveyed the thanks of the meeting for Dr. Smith's address and expressed the hope that the Section of Urology would have a long and valuable life. Like Dr. Murray Morton, he also could go back to the days when catheterization was not an aseptic proceeding. Many years before, when practising at Cheltenham, Victoria, a tramp had called suffering from urinary retention, and asked him for relief, which he had given. The tramp was grateful for this and asked him if he would lend him the catheter, which he did. Five years later the tramp returned and asked him if he

could do a day's work as an act of gratitude for his previous kindness. When asked how he had got on, the tramp replied that he had used the catheter twice a day ever since and had lubricated it with his own saliva.

Dr. Julian Smith, in reply, said that he had purposely kept the subject of his address within comparatively narrow limits, as it was too wide a field to be discussed adequately at one meeting.

Referring to Dr. Tait's instances of partial prostatectomy, Dr. Smith quoted the case of a man, aged sixty-eight years, who had consulted him with symptoms of prostatic obstruction. Cystoscopic examination revealed a huge left-sided protuberance which looked like a malignant left lobe. The summit was ulcerated and lime-encrusted. On opening the bladder this mass still more suggested malignant disease, but on attempting to remove it the mass came away surprisingly easily and proved on examination to be simply half an enlarged prostate. Owing to the suspicion of malignant disease, nothing further had been done at the operation, but this partial prostatectomy seemed to have been effective, as the patient was urinating perfectly after ten years. He had, however, met other cases of partial prostatectomy that subsequently had required a further complete operation for either obstruction or calculus.

Dr. Smith complimented Dr. Alan Newton on his adoption of the Harris method. He was sure that in such skilful hands this method would be successful. He considered Dr. Newton's criticisms of the hæmostatic bag a little harsh. It should be remembered that the bag must not enter the prostatic cavity, but should carry the margins of the mucous membrane into the cavity and so begin to create a new urethra. The rubber of the bag must be of the finest quality and in good order.

Referring to Dr. Devine's method of operating under local anæsthesia, Dr. Smith said that if plenty of time were available and if the temperament of the operator and of the patient were suitable, local anæsthesia was the ideal method; in such matters the only rule was that there was no rule. Dr. Murray Morton's criticism of Dr. Devine's suction drainage method on the ground of waste of water was a little more drastic than he (the speaker) would have considered necessary. In such a city as Melbourne the use of some water did not matter. Nevertheless, he preferred a largish, right-angled, suprapubic, self-retaining drainage tube. This must lie flat on the skin of the abdomen and did not need packing with gauze to support it, as the latter tended to render siphonage inefficient. The wound would become dry from twenty-four hours after operation onwards.

Referring to Dr. Ostermeyer's questions, Dr. Smith said that the subject was too broad to cover adequately. Orchidectomy had not much influence on the size of the prostate; it was not a minor operation and some mortality was attached to it; also it was frequently followed by a severe psychic disturbance.

Prostatectomy did not appear as a rule to curtail what in each case remained of sexual appetite. The complaint made to him by some patients was that nothing issued from the meatus at the culmination of coitus. He had been able to show, however, spermatozoa in quantity in the first urine passed after the act. Others complained that the act could be started quite normally, but that no satisfactory termination occurred, nothing but a gradual collapse of the erection. It might be of interest to Dr. Ostermeyer to know that the speaker had treated two patients with gonorrhœa after complete prostatectomy, one seven years and the other eleven years after operation.

Many patients had refused prostatectomy, but submitted to deep X ray therapy, and it was said that this was helpful in the amelioration of symptoms. Dr. Smith thought that deep therapy did bring about some lessened activity in the prostate gland.

Dr. Hurley had raised the question of the indications for treatment and Dr. Smith drew attention to one factor which might be considered in attempting to relieve the symptoms of old men suffering from frequency and discomfort, but with little residual urine. In such cases prostatic massage at intervals of two or three days to a week would get rid of one or two drachms of prostatic fluid and the patients said that they were thereby rendered much more comfortable and had far less nocturia.

Referring to prostatectomy in younger men, Dr. Smith said he had removed prostates for irritation alone with great improvement in general health from the relief of trigonal irritation. It was probably true that many prostates should be removed earlier than they usually were, but before this became a general practice human nature must change, as most people were confirmed procrastinators. There was no doubt that operation was the ideal treatment for irritation causing ill-health or obstruction proved by appropriate tests to be damaging the kidneys. He considered that public propaganda on the subject might do more harm than good.

Referring to the resectoscope method described by Dr. Mortensen, Dr. Smith said that he had used it and agreed with Dr. Mortensen that it was not a simple proceeding. He did not approve of its general use, because a high percentage of prostates removed for enlargement were found on examination to be malignant and the malignant change was not infrequently central. Such cases, if treated by the urethral route, would tend to become hopelessly malignant. Also it must be remembered that severe hæmorrhage sometimes complicated this operation, and in some cases in Melbourne cystotomy had been required to deal with it.

A MEETING OF THE NEW SOUTH WALES BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at Saint Vincent's Hospital on September 20, 1934. The meeting took the form of a series of demonstrations by the members of the honorary staff. The first part of this report appeared in the issue of November 10, 1934.

Subacute Combined Degeneration of the Cord.

DR. J. S. SHERWOOD showed a female patient, aged sixty-one years, who had complained of "numbness" of both legs for a month. She had been unable to walk without the aid of a stick for the past few days. She complained also of numbness of the finger tips. She had always been rather pale and her pallor had increased lately. She suffered from "dyspepsia" at times and her tongue, which was sore a few weeks ago, was better now. She suffered from shortness of breath on slight exertion. She had had appendicectomy performed one year previously.

On examination both pupils were equal and reacted to light and accommodation. Right-sided interstitial keratitis was noticeable. Both knee jerks appeared active. Both plantar reflexes were flexor in type. Definite ataxia of the upper and lower limbs was noticed. Loss of sense of passive position and passive movement was pronounced in the lower extremities. Anæsthesia to light touch *et cetera* of stocking distribution in the lower extremities was well marked. Less definite sensory disturbances affected the upper extremities.

The blood did not react to the Wassermann test; the cerebro-spinal fluid also failed to yield a reaction. A fractional test meal revealed achlorhydria. The erythrocytes numbered 3,750,000 per cubic millimetre, the hæmoglobin value was 80% and the colour index 1·06. The leucocytes numbered 8,400 per cubic millimetre. A tendency towards an increase in the size of the red cells was noticed.

Case for Diagnosis.

Dr. Sherwood also showed a male patient, aged twenty-seven years, who complained of not having felt well for fifteen years. He had felt languid and easily tired during the whole of that period. He had suffered from shortness of breath and palpitation. He complained that he had frequently suffered from "indigestion". He formerly had repeated attacks of epistaxis, but had had no recurrence lately. He had attacks of vomiting twelve months ago. He had been informed that he had an enlarged spleen.

On examination, apart from slight splenic enlargement, gross pathological signs seemed conspicuously absent, a slight icterus being the most noticeable other feature. The blood did not react to the Wassermann test. The direct Van den Bergh test gave a negative and the indirect test a weakly positive result.

A full blood count revealed the following:

Erythrocytes, per cubic millimetre ..	4,200,000
Hæmoglobin value	90%
Colour index	1·07
Leucocytes, per cubic millimetre	4,400
Neutrophile cells	62%
Eosinophile cells	2%
Lymphocytes	32%
Mononuclear cells	2%
Basophile cells	2%

Pronounced anisocytosis and poikilocytosis were present. Many macrocytes were seen.

Dr. Utz's report on the red cells was as follows:

> There is a persistent, unusual change in the shape of the red cells in this patient. A fair proportion of the cells appear in the film as elongated elliptical cells, much longer and thinner than normal. I have never seen this appearance in blood before.

A full blood count one week later reevaled the following:

Erythrocytes, per cubic millimetre ..	4,180,000
Hæmoglobin value	90%
Colour index	1·08
Leucocytes, per cubic millimetre	6,000
Neutrophile cells	76%
Eosinophile cells	2%
Lymphocytes	20%
Monocytes	2%

The red cells showed a marked degree of anisocytosis and poikilocytosis, the cells tending to be increased in size. No nucleated red cells were seen. The red cells again showed the elongated appearance noted in previous examinations. Coagulation time was very slightly delayed (time, six minutes). The bleeding time was four minutes. The fragility test gave a normal result. The blood platelets numbered 147,000 per cubic millimetre.

The fractional test meal examination did not seem particularly helpful from a diagnostic point of view.

Dr. Sherwood said that a provisional diagnosis of pernicious anæmia had been made in this case. The striking features were the unusual and persistent elongation of the red cells and the atypical fractional test meal findings.

In reference to the shape of the red cells the following extract from "Nelson's Loose Leaf Medicine" appeared interesting:

> There are a number of forms of anæmia in which the exact method of production is not clear, for example, splenic anæmia or Banti's disease. There are in addition some rare forms of anæmia of which we have little knowledge at present. Among such obscure anæmias, an anæmia occurring among people with negro blood deserves mention. Peculiar elongated and sickle-shaped red cells characterise the blood picture in this condition.

The present patient appeared white, was born in the north of Ireland, had had no history of diarrhœa at any time, and had always been a city dweller.

Pyknolepsy.

Dr. Sherwood's third patient was a girl, aged sixteen years, who had been taking fits for years—minor attacks since infancy and major attacks (convulsions) since she was eleven years of age. She had had three major attacks in the past month. Prior to that none had occurred for eight months. The patient's mother said that the patient had had as many as 150 minor attacks in a day. She generally averaged from 40 to 50 per day. The attacks appeared unaffected by bromide and "Luminal" medication. The onset of an attack was not affected by the child having her attention focused at the time. Attacks occurred during sleep. After the minor attacks the patient immediately picked up the thread of conversation or action as though nothing had happened. Recently she had inquired what she was doing or saying. She did not tend to sleep after a minor attack. A minor attack never lasted longer than a few seconds—not longer than twenty seconds. She had very rarely passed urine in an attack, much less frequently now than a few years ago. The patient had no warning of minor attacks, but had momentary warning ("freezing of the mouth") before major attacks. She slept after major attacks.

Epilepsy Major.

Dr. Sherwood also showed a male patient, aged fifty-nine years, who complained of having had fits since he was four years of age. The fits had been more frequent during the last three to four years. He experienced an aura always, feeling queer, becoming muddled, and his mouth becoming parched. He became unconscious, fell down, but had never bitten his tongue or frothed at the mouth.

On examination an extensive port wine stain was seen to extend over the right frontal and maxillary regions of the face. There was an inequality of the pupils, the right being larger than the left. Both pupils reacted to light and accommodation. Both knee jerks were active and both plantar reflexes were flexor. The systolic blood pressure was 150 and the diastolic pressure 130 millimetres of mercury. On making an X ray examination of the skull Dr. Oxenham reported that there was a large area of increased density apparently underlying the right frontal region and possibly due to a calcification of a subdural hæmorrhage. Dr. Oxenham said he would like to have a stereoscopic right lateral and a longitudinal picture to determine whether the area was deep-seated in the brain. He reported also a commencing calcification of the choroid plexus.

Stereoscopic skiagrams showed the area of increased density previously reported to be lying deeply and apparently in the region of the anterior horn of the lateral ventricle.

Left Hemi-Anæsthesia.

Dr. Sherwood's next patient was a woman, aged thirty-four years, who complained of the sudden onset, four days previously of "a dead feeling in the left side of the face", which had persisted ever since. The sight in the left eye was at first "blurred", but soon recovered. A feeling of "fullness' persisted in the left side of the face at the time of examination. In two months the patient had lost 12·6 kilograms (two stone) in weight. She had previously had a pelvic operation, in which both Fallopian tubes, one ovary, and the appendix had been removed. In a later operation adhesions had apparently been separated.

On examination complete hemi-anæsthesia of the left side of the face, of the trunk, upper and lower parts of the left arm and leg were discovered. The anæsthesia was found to terminate abruptly at the mid-line. There was some loss of power in the affected limbs. Apart from exaggeration of the left knee jerk, all the deep reflexes appeared normal. Both plantar reflexes were flexor in type.

X ray examination of the skull and cervical spine revealed no abnormality. The Wassermann test applied to both blood and cerebro-spinal fluid yielded no reaction.

A diagnosis of hysterical hemi-anæsthesia was made.

Congenital Heart Disease.

Dr. Sherwood also showed a female patient, aged fifteen years, who complained of a cough of one week's duration. She had previously had whooping cough, measles and bronchitis. She had frequently complained of growing pains and had suffered from headache since early childhood. She was said to have had heart trouble at eighteen months of age. She did not complain of shortness of breath on exertion. There was no urinary frequency. She had had frequent attacks of epistaxis.

On examination the apex beat of the heart appeared to be in the fifth intercostal space, about 1·25 centimetres

(half an inch) outside the nipple line. A diffuse systolic thrill was palpable and maximum in intensity over the pulmonary area. A harsh to-and-fro murmur was audible at the base of the heart, of maximum intensity over the pulmonary area. The murmur was well heard also in the interscapular region. There was no evidence of cyanosis or clubbing of the fingers.

A diagnosis of probable patent *ductus arteriosus* was made.

Charcot's Joints.

Dr. Sherwood's last patient was a woman, aged fifty-eight years, who said she was in good health until fifteen years ago, when she woke up one morning with pain and swelling in the region of the left knee joint. She was confined to her bed for nine months. Some years later she experienced similar trouble in the right knee joint. For eleven years she was unable to walk. During the last three years she had been able to walk about fairly well, but not in the dark. She said she had had septicæmia twice, had had three stillborn children and two miscarriages.

On examination the pupils were unequal, the left being larger than the right. Both pupils reacted sluggishly to light and actively to accommodation. Both knee jerks and ankle jerks were absent. Definite hypotonia, well marked Rombergism, and other tabetic signs were noticeable. Both knee joints were grossly enlarged and deformed, and X ray examination confirmed the diagnosis of Charcot's joints. The radiologist reported the presence of extensive disorganization of both knee joints and commencing changes of a similar nature around both ankle joints.

Mitral Stenosis and Laryngeal Paralysis.

DR. R. JEREMY showed a single woman, aged forty-three years, who had suffered from rheumatic fever at thirty-one years of age and from scarlet fever at ten years of age.

The patient complained in November, 1933, of hoarseness of voice for five months. Examination by a rhinologist showed that she had a paralysis of the left vocal cord.

X ray examination of the œsophagus showed that the bolus passed freely into the stomach, deviating to the right in an antero-posterior view at the right border of the heart and also posteriorly when the patient was examined in the right oblique position. X ray examination of the heart revealed an egg-shaped shadow in the antero-posterior view, which was presumed to be the left auricle. Clinically the heart did not appear to be enlarged, but a presystolic thrill and murmur were present with a greatly accentuated second sound at the pulmonary area.

A mediastinal neoplasm was considered as a cause of the symptoms, but the subsequent course had not strengthened this view and the laryngeal paralysis was thought to be due to the pressure on the recurrent laryngeal nerve from an enlarged left auricle.

Coarctation of the Aorta.

DR. R. J. TAYLOR showed a male patient who was suffering from coarctation of the aorta. It is hoped that this case will be published in full in a subsequent issue.

Myasthenia Gravis.

Dr. Taylor also showed a woman, aged nineteen years. She gave a history that in the latter half of 1931 it was noticed that she had developed a peculiar laugh with contortion of the upper part of the face. This was soon followed by ptosis, particularly marked on the left side, diplopia, a nasal voice, and difficulty in chewing and swallowing. To finish chewing a mouthful of food she would have to move her lower jaw up and down with the thumb and forefinger of her right hand. She was unable to talk while eating. She had lost weight and was easily fatigued. She was confined to the house and spent nearly all her time lying or sitting.

In March, 1934, she was given 0·03 gramme (half a grain) of ephedrin sulphate twice a day. On account of the high cost of glycin, eighty grammes of gelatine boiled down into a jelly were given in divided doses fifteen minutes before the ephedrin was taken.

After two months very little improvement was noted and she was beginning to tire of the gelatine. The daily dose of ephedrin was increased rapidly till she was having 0·03 gramme (half a grain) five times a day.

Improvement soon became noticeable. Now, six months after initiation of treatment, she was putting on weight, felt much stronger, was busy about the house all day and could walk a mile without undue tiredness. She could chew and swallow quite well and could converse normally at table. The ptosis was much less marked. She still had the nasal smile and nasal speech, and diplopia, which was the most troublesome symptom, persisted.

Tabes Dorsalis.

Dr. Taylor also showed a male patient, aged fifty-one years, who, in February, 1934, had been unable to walk for three years and could not stand. He was moved from place to place even in the house in a wheeled chair. He suffered from *tabes dorsalis* and from Charcot's disease of both hips and left tarsus. Considerable swelling of the right hip was present.

Potassium iodide was given. At first the dose was 1·0 gramme (15 grains) three times a day, but this was quickly increased to 4·0 grammes (60 grains) three times a day. The drug was well tolerated.

Much of the swelling in the region of the right hip had disappeared, the patient could stand and could walk round the house, supporting himself from time to time on furniture or walls.

Carcinoma of the Colon.

SIR JOHN MCKELVEY showed five patients who had been operated upon for carcinoma of the colon. The first had a carcinoma of the caecal region, the second of the descending colon, the third of the junction of the iliac and pelvic colon, and the fourth and fifth of the rectum. The operations were all done in one stage without preliminary colostomy. In the case of the caecal adeno-carcinoma the terminal part of the ileum, caecum, ascending colon and right half of the transverse colon were removed and a lateral anastomosis was done between the ileum and transverse colon.

The operation for the cancer of the descending colon was practically a replica of the former operation, but the left half of the colon was removed, namely, the left half of the transverse colon, the descending colon, the iliac colon, and a lateral union was made between the transverse colon and the pelvic colon.

In the third patient, with a neoplasm at the junction of the pelvic and iliac colon, the same operation was done. The sacrifice of the descending colon and left colon flexure (splenic) was necessary in these cases to allow a lateral anastomosis between two pieces of colon completely encircled by peritoneum. In the other two cases an abdomino-perineal resection was performed.

Sir John McKelvey said that he knew that these were examples of a surgical heresy, in that they were one-stage operations with stitched anastomosis. He always did lateral anastomosis close to the blind end of the bowel, using three layers of fine catgut and giving an aperient on the second day. If obstruction was present to an appreciable degree, he suggested a preliminary colostomy.

(To be continued.)

Correspondence.

LOCAL ANÆSTHESIA: "SODIUM AMYTAL" AND MORPHINE.

SIR: In a recent number of THE MEDICAL JOURNAL OF AUSTRALIA (October 27, 1934) a contributor describes different procedures connected with the production of local anæsthesia in the nose and in the ear. These or similar measures have been a routine in this part of Australia, and, I think, in other parts also, for many years, and to dwell on them is to stress what is already

well known and established. But there is one thing to which I think criticism ought to be directed—your contributor's advice to use as a preliminary six to nine grains of "Sodium amytal" followed by morphine, one-quarter of a grain, and hyoscine, one one-hundredth of a grain. In certain patients it is possible for the doses recommended to produce unpleasant and even alarming symptoms. A warning was issued in *The British Medical Journal* some months ago against combining the actions of "Sodium amytal" and morphine, and it is one that should not be ignored.

Yours, etc.,
H. V. FOXTON.

Ballow Chambers,
Wickham Terrace,
Brisbane,
November 3, 1934.

THE USE OF "EVIPAN" IN DEMENTIA PRÆCOX.

SIR: I feel it is worth while placing on record the result of using "Evipan" intravenously for the control of acute excitement in *dementia præcox*.

A young woman gave a typical history of schizophrenic deterioration over a course of eighteen months. When first seen she had not slept for seven nights and was extremely excited and severely deluded and hallucinated (believing herself the Virgin Mary). A hypodermic injection of morphine (half a grain) with sulphonal (thirty grains) by mouth, failed to control her excitement in any way. Ten hours later an intravenous injection of "Evipan" (five mils) produced a condition indistinguishable from normal sleep. Unconsciousness came on within five seconds and the patient remained asleep for ten hours, and after a short period of wakefulness she slept the best part of the next day. During the period of narcosis no untoward symptoms were observed and the blood pressure remained 120-80.

The patient has since been controllable with reasonable doses of bromides and barbiturates.

I feel convinced that the patient was saved from collapse by the efficiency of this form of intravenous medication, and I feel sure that it would be equally valuable in the excitement of acute mania and the confusion states.

Yours, etc.,
GODFREY HARRIS, M.B., B.S.

Wyangala,
New South Wales,
November 4, 1934.

University Intelligence.

THE UNIVERSITY OF SYDNEY.

A MEETING of the Senate of the University of Sydney was held on November 5, 1934.

The Senate recorded its sincere sympathy in connexion with the death of Mr. Samuel Craddock, who had served the University faithfully as Yeoman Bedell from 1882 to 1918.

Assistant Professor G. F. Sutherland and Dr. G. D. Osborne were appointed as representatives of the Senate on the Board of Directors of the Sydney University Union.

The following appointments were approved: Dr. H. H. Schlink as Lecturer in Gynæcology; Mr. D. A. Gill as Acting Lecturer in Veterinary Pathology until January 31, 1935.

On the recommendation of the Conjoint Board of the Children's Hospital, the following appointments to the Honorary Staff of the Hospital were approved: Honorary Medical Officer in Charge of the Psychiatric Clinic, Dr. D. W. H. Arnott; Honorary Radiographer, Dr. B. P. Anderson-Stuart; Honorary Assistant Radiographer, Dr. E. W. Frecker.

Dr. A. J. Arnott was appointed Dean of the Faculty of Dentistry for one year from January 1, 1935, on which date he will enter upon his duties as Professor of Dentistry in succession to Professor R. Fairfax Reading.

On the recommendation of the Faculty of Dentistry it was resolved to award the degree of Doctor of Dental Science to Mr. F. E. Helmore, B.D.S., for the thesis presented by him, entitled "Practical Observations on the Relationship between Pathological Conditions of the Oral Cavity and Diseases of the Eye". The examiners reported that Mr. Helmore's thesis was an original contribution of distinguished merit, adding to the knowledge and understanding of dental science. Mr. Helmore graduated Bachelor of Dental Surgery in 1926 with second class honours.

Proceedings of the Australian Medical Boards.

QUEENSLAND.

THE undermentioned have been registered, pursuant to the provisions of *The Medical Acts, 1925 to 1933*, of Queensland, as duly qualified medical practitioners:

Burfitt, James Fitzmaurice, M.B., B.S., 1933 (Univ. Sydney), Brisbane.
Kilgour, Heather, M.B., M.S., 1922 (Univ. Sydney), Gympie.
Noble, Henry Winston, M.B., B.S., 1933 (Univ. Sydney), Brisbane.

Additional qualification:

McCallum, Frank, D.T.M. and H., 1923 (England), Brisbane.

TASMANIA.

THE undermentioned has been registered, pursuant to the provisions of the *Medical Act*, 1918, of Tasmania, as a duly qualified medical practitioner:

Rule, Viva Eileen Kennedy, M.R.C.S. (England), L.R.C.P. (London), 1924, D.T.M. and H. (London), 1927, Ulverstone, Tasmania.

Obituary.

LIONEL JOHN HOOD.

WE regret to announce the death of Dr. Lionel John Hood, of Melbourne, which has occurred in London.

JOHN HENRY SEMPLE.

WE regret to announce the death of Dr. John Henry Semple, which occurred at East Malvern, Victoria, on October 26, 1934.

HAROLD THORNTON BOURNE.

WE regret to announce the death of Dr. Harold Thornton Bourne, which occurred on October 19, 1934, at Kew, Victoria.

Books Received.

A MANUAL OF DISEASES OF THE EYE, by C. H. May, M.D., and C. Worth, F.R.C.S.; Seventh Edition, extensively revised by M. L. Hine, M.D., F.R.C.S.; 1934. London: Baillière, Tindall and Cox. Demy 8vo., pp. 515, with 350 illustrations and 23 plates. Price: 15s. net.

DIET IN THE MODERN HOSPITAL: A HANDBOOK ON FEEDING THE SICK, by J. de K. Whitsed, with an introduction by J. Orr, M.D., F.R.C.P.Ed.; 1934. Crown 8vo., pp. 228. Price: 5s. net.

DE VENARUM OSTIOLIS 1603 OF HIERONYMUS FABRICIUS OF AQUAPENDENTE (1533?-1619), Facsimile Edition with Introduction, Translation and Notes by K. J. Franklin, D.M.; 1933. Springfield: C. C. Thomas; London: Baillière, Tindall and Cox. Royal 8vo., pp. 98, with illustrations. Price: 13s. 6d. net.

Diary for the Month.

Nov. 20.—Tasmanian Branch, B.M.A.: Council.
Nov. 20.—New South Wales Branch, B.M.A.: Ethics Committee.
Nov. 21.—Western Australian Branch, B.M.A.: Branch.
Nov. 21.—Victorian Branch, B.M.A.: Clinical.
Nov. 22.—New South Wales Branch, B.M.A.: Clinical.
Nov. 23.—Queensland Branch, B.M.A.: Council.
Nov. 27.—New South Wales Branch, B.M.A.: Medical Politics Committee.
Nov. 28.—Victorian Branch, B.M.A.: Council.
Nov. 29.—South Australian Branch, B.M.A.: Branch.
Nov. 29.—New South Wales Branch, B.M.A.: Branch.

Medical Appointments.

Dr. J. N. Morris (B.M.A.) has been appointed a Member of the Medical Board of Victoria, pursuant to the provisions of Section 3 of the *Medical Act*, 1928.

* * *

Dr. B. R. Woods (B.M.A.) has been appointed a Certifying Medical Practitioner at Port Fairy, Victoria, pursuant to the provisions of the *Workers' Compensation Act*, 1928.

* * *

Dr. E. S. Morris (B.M.A.) has been appointed Director-General of Public Health for New South Wales, Chief Medical Officer of the Government, President of the Board of Health, Inspector-General of Hospitals and Charities, and Commissioner under the *Venereal Diseases Act*, 1918.

* * *

Dr. M. G. Fox (B.M.A.) has been appointed Government Medical Officer at Narooma, New South Wales.

* * *

Dr. D. W. Hawke (B.M.A.) has been appointed Government Medical Officer at Coff's Harbour, New South Wales.

* * *

Dr. A. Owen (B.M.A.) has been appointed Government Medical Officer at Tullamore, New South Wales.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser," pages xvi, xvii and xix.

BALLARAT AND DISTRICT BASE HOSPITAL, BALLARAT, VICTORIA: Medical Superintendent.

BOULIA HOSPITAL, BOULIA, QUEENSLAND: Medical Officer.

DEPARTMENT OF PUBLIC HEALTH, WESTERN AUSTRALIA: Medical Officer.

HOBART PUBLIC HOSPITAL, HOBART, TASMANIA: Junior Resident Medical Officers.

LAUNCESTON PUBLIC HOSPITAL, LAUNCESTON, TASMANIA: Resident Medical Officers.

THE BUNDARRA DISTRICT HOSPITAL, BUNDARRA, NEW SOUTH WALES: Medical Officer.

THE QUEEN'S (MATERNITY) HOME, INCORPORATED, ROSE PARK, SOUTH AUSTRALIA: Resident House Surgeon.

THE WOMEN'S HOSPITAL, CROWN STREET, SYDNEY, NEW SOUTH WALES: Resident Medical Officers.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Brisbane Associate Friendly Societies' Medical Institute. Chillagoe Hospital. Members accepting LODGE appointment and those desiring to accept appointments to any COUNTRY HOSPITAL are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	Officer of Health, District Council of Elliston. All Lodge Appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 205, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (Wellington Division): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original article forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor", THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognise any claim arising out of non-receipt of journals unless such a notification is received within one month.

SUBSCRIPTION RATES.—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rates are £2 for Australia and £2 5s. abroad *per annum* payable in advance.